

# BULLETIN

OF THE

## AMERICAN GEOGRAPHICAL SOCIETY

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Vol. XLII

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No. 2

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### THE FUTURE HOME OF THE SOCIETY

The fortunate circumstances that have made it possible for the American Geographical Society to secure, for the growing needs of its work, a permanent home far more imposing and commodious than its present house, are described in the *Annual Report* of the Council to the Society. Our frontispiece shows the building now in course of erection at Broadway and 156th Street. In this handsome and dignified structure will center all the future activities of the Society. It will be supplied with every convenience for the conduct of all phases of the Society's work and for the comfort of Fellows, readers, geographical specialists and students who may desire to consult its literary and map collections.

The new building will occupy a part of the old-time Audubon Park. To the west of it are the fine buildings of The Hispanic Society of America, The American Numismatic and Archæological Society and the Spanish Church of Our Lady of Guadalupe, now nearing completion. Just beyond is Riverside Drive and the broad surface of the Hudson, with the wall of the Palisades in the background. Other buildings, devoted to science and art, will probably occupy the remaining sites on this beautiful plateau.

In no over-crowded city could a more ideal spot be found for a center of scientific activity. Occupying one of the higher elevations of Manhattan Island, easily accessible though remote from the great centers of business and traffic, wide Broadway on one side, no crowding of structures on the spacious grounds, the location of our new building is in perfect keeping with the nobility and beauty of the

structure. No wall will touch any side of it. The two façades, shown in the illustration, give a good idea of the whole exterior, all the faces of the building being similar in design.

The building will have a frontage of 65 feet on Broadway and 125 feet on 156th Street; the main entrance will be on the south side, reached through a Broadway gate and a walk traversing a wide court. Built entirely of Indiana limestone, the structure will be in the style of the Italian Renaissance, conforming in architectural design to the other buildings on the grounds. It will have four stories and a basement, the latter extending under the entire building and affording large space for the storage of publications, map plates and supplies, the engine room, heating plant, workshop, rooms for the caretaker, etc.

A most interesting feature is the stack rooms, in the west part of the building, where the book collections will be kept. There are to be six stack floors, each 57 by 33 feet, and every one easily accessible from all the others and from each of the four floors of the main building. These six floors will have a storage capacity about five times as large as that of our present library, to say nothing of the book storage facilities reserved in the basement. Provisions are thus made for the accumulations of generations to come.

The main entrance is through an oval vestibule leading to a wide hall, opening out of which are the business office, a spacious room for meetings of the Council of the Society and two large rooms extending along the 156th Street front. These rooms, when desirable, may be thrown into one and used for a lecture hall. They will seat about 400 persons and will well serve the purposes of scientific meetings and other occasions when the attendance is not expected to be large. Adjoining the office, is a room for the mailing department and the storage of the Society's *Bulletin*. An electric elevator will run between the basement and the top floor.

The offices of the editorial and library departments are on the second floor. On the south side of the building overlooking the court, are the rooms of the librarian and his assistants and a reception room to which visitors will be directed. Across the hall and extending along the 156th Street front from Broadway to the stack rooms, are two editorial rooms and a spacious magazine and reading room. The geographical periodicals of every land will be kept in the reading room where visitors will find every convenience for consulting the current literature of the earth studies. Specialists and others who come to the Society for study and research, will find

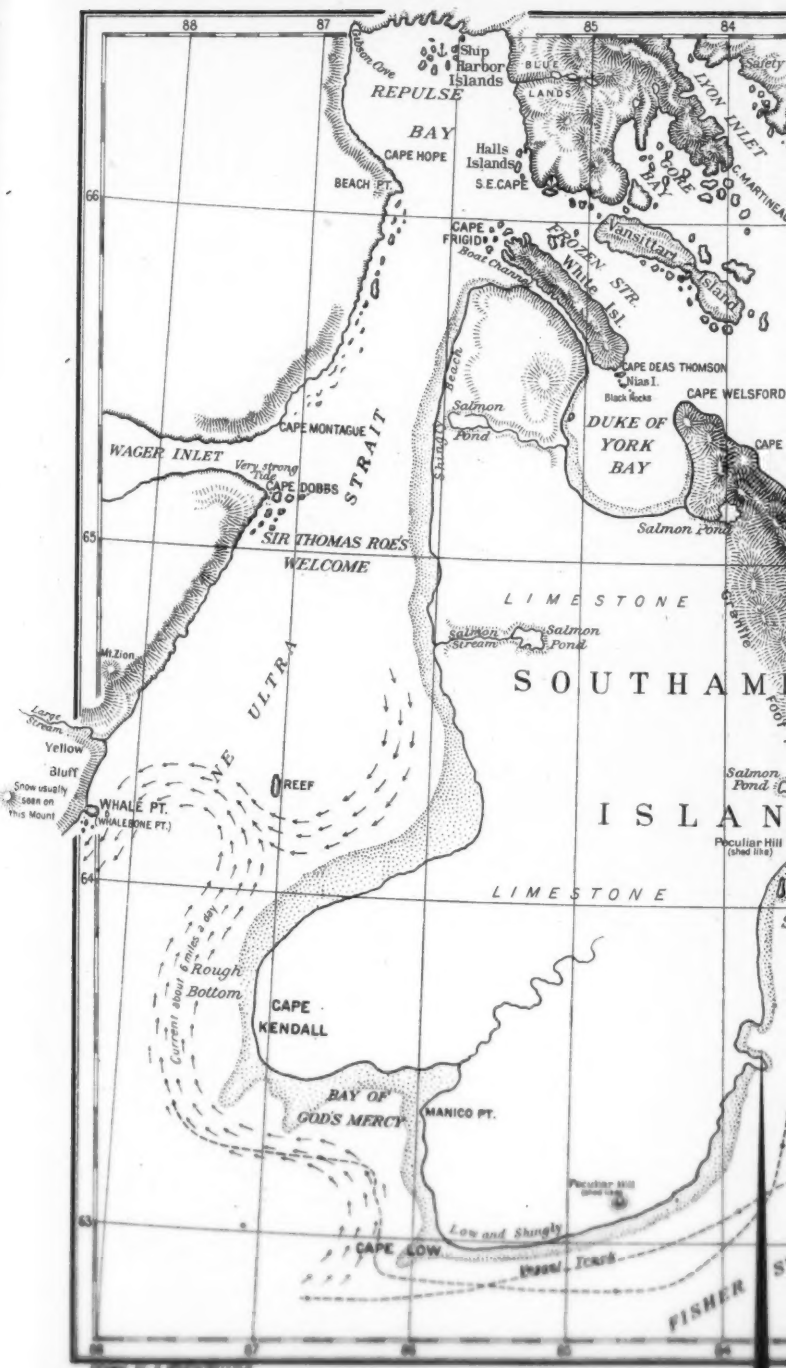
accommodations in a number of study rooms on the second and third floors where the books and map material desired may be assembled and each may pursue his work in quiet.

The third floor will be entirely given to the map department and study rooms. Here are the offices of the map curator and his assistants. About two-thirds of the entire space will be devoted to two map rooms where the rapidly growing cartographic collections will be stored in a manner that will safeguard them, as much as possible, against dust and deterioration, while each item will be easily accessible.

The chief feature of the fourth floor will be the large map-drafting room, with abundance of overhead light for craftsmen engaged in a branch of the graphic arts which, in its finer phases, is trying to the eyes. Here, also is the fan-room, the culminating feature of the system of ventilation which is to give perfect circulation of air throughout the building. It is needless here to speak in any detail, of the numerous conveniences on every floor, such as book-lifts, filing compartments for manuscripts, enclosed pigeonholes, hot and cold water from basement to roof, etc., which will greatly facilitate the duties of the working staff. A telephone system will connect all the departments.

The frontispiece shows the name of the Society on the Broadway façade of the building. The names of about thirty of the most illustrious explorers, geographers and cartographers of past centuries will be similarly placed on the other façades. No inflammable material will enter into the construction of the building, which is to be as nearly fireproof as it is possible to make it.

Many geographers throughout the country have already expressed interest in this new and great addition to the facilities of the Society; and our Fellows cannot fail to share the feeling of the Council that, when this noble building is completed, "it will be an ornament to the city and a credit to the Society, its President and all concerned."







## A GEOGRAPHICAL DESCRIPTION OF SOUTHAMPTON ISLAND AND NOTES UPON THE ESKIMO

BY

GEORGE COMER\*

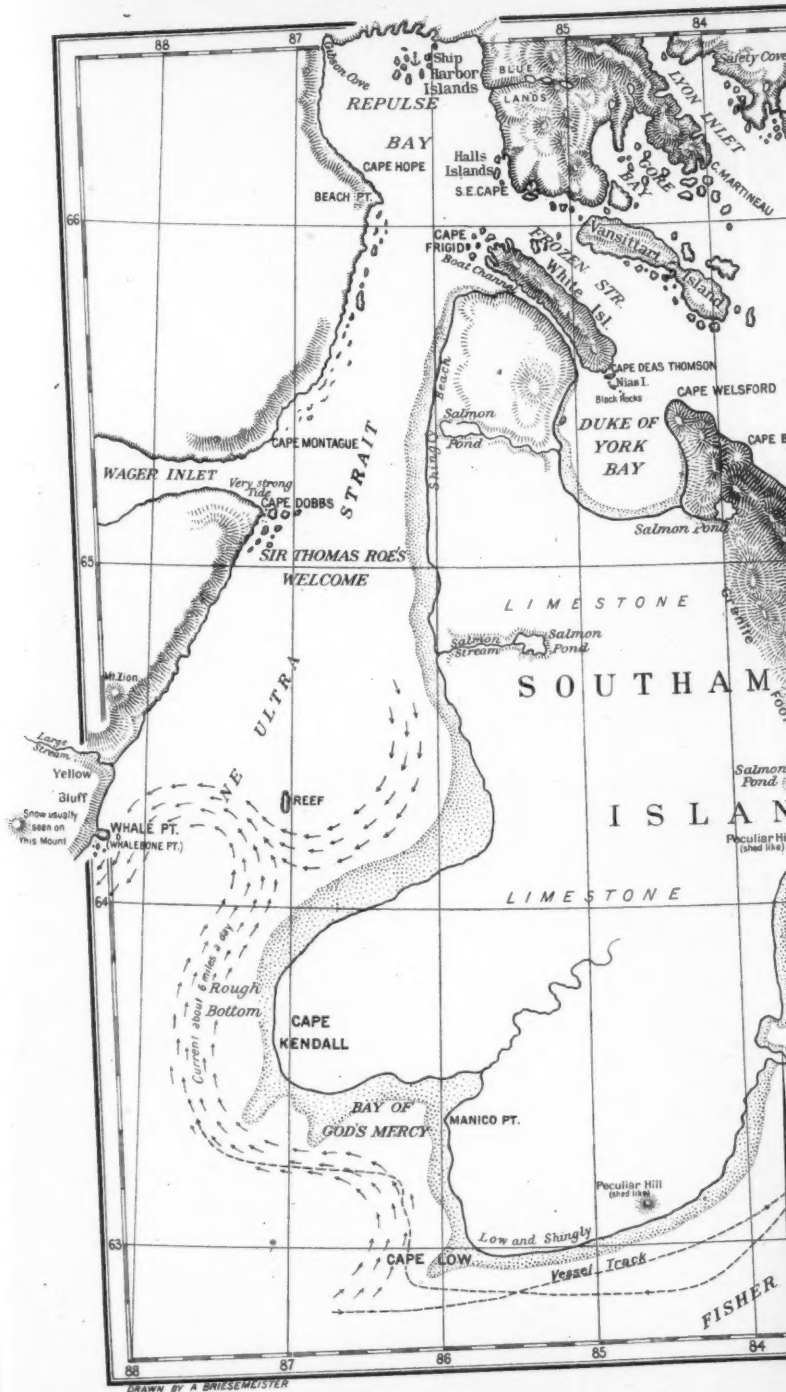
The Island of Southampton, lying, as it does, in the great ice belt at the extreme northerly end of Hudson Bay, has no especial commercial value and is practically inaccessible during the greater part of the year. The writer, nevertheless, has prepared the accompanying map and written the following description of the island and its people, both of which may be of practical assistance to subsequent explorers and of scientific interest to those who are studying the many problems of arctic life.

The Island of Southampton is about 175 miles from north to south and approximately the same from east to west. There are but few places on the west and south shores where it is safe for a vessel to "stand in" nearer than five miles, and to the south of Cape Kendall even ten miles is dangerous. A hitherto unknown reef, three miles in length, lies about fifteen miles north of Cape Kendall in Lat.  $64^{\circ} 17'$ . It is especially dangerous, since it can be seen only at low tide, although deep water is found from two to three miles on either side. A strong current (which I have estimated at about six miles a day) sweeps by Cape Kendall and strikes across this reef to the north of Whale Point, thence south past Cape Fullerton.

On older maps, an island (known as Tom Island) is indicated to the south of Cape Kendall. This does not exist. The error may be explained by the fact that at this point the waters are shallow, and the ice, in forming, takes up large quantities of rock and dirt, which gives the drifting mass the appearance of land. The existence of Walrus Island (Lat.  $63^{\circ} 17'$ ), in Fisher Strait, has been authenticated; but "Bell Island" is not separated from the

\* Captain George Comer has had an experience of thirty-five years as a whaler in Cumberland Gulf and Hudson Bay, and has spent ten winters on Southampton Island and the contiguous shores of the mainland. Several years ago The American Museum of Natural History, recognizing his reliability as an observer and his zeal as a collector, encouraged him to study the country near the mouth of Hudson Bay, to acquaint himself with the primitive people of Southampton Island and the neighboring shores, and to make collections for the Museum illustrating the zoölogy, geology and ethnology of the region. During his voyage of 1907-1909, Captain Comer made a survey of Southampton Island, and his friends at the Museum and at the American Geographical Society have urged him to prepare the paper published herewith.—EDITOR.





DRAWN BY A BRIESEMEISTER

**CORRECTED MAP  
OF  
SOUTHAMPTON ISLAND**

FROM OBSERVATIONS AND SKETCHES  
BY  
**CAPTAIN GEORGE COMER**  
MASTER OF THE SCHOONER A.T. GIFFORD

STATUTE MILES

0 5 10 20 30 40 50

**FOX  
CHANNEL**

**SOUTHAMPTON ISLAND**

CAPE WELSFORD  
CAPE BYLOT  
CAPE COMFORT  
CAPE FISHER  
ME MURDO PT.  
TERROR PT.  
LEYSON PT.  
EVANS INLET  
C. PREFONTAIN  
C. PEMBROKE  
COATS I.

**BELL ISLAND**

SEAHORSE PT.  
"Gore I."  
"BELL ISLAND"  
"Gore I."  
"BELL ISLAND"  
"Gore I."

SHALLOW BAY  
NATIVE PT.  
Coral Harbor  
SMALL LIMESTONE  
Good Water  
WALRUS I.  
WALRUS I.  
WALRUS I.

Salmon Pond  
Peculiar Hill (Used 1848)  
Bear's Bay  
Shallow Bay  
NATIVE PT.  
Good Water  
WALRUS I.  
WALRUS I.  
WALRUS I.

Very low and dangerous

WINTER I.  
Safety Cove  
LION INLET  
CA. MARTINEAU  
THOMSON  
ISLAND  
CAPE WELSFORD  
CAPE BYLOT  
CAPE COMFORT  
CAPE FISHER  
ME MURDO PT.  
TERROR PT.  
LEYSON PT.  
EVANS INLET  
C. PREFONTAIN  
C. PEMBROKE  
COATS I.

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LION INLET  
CA. MARTINEAU  
THOMSON  
ISLAND

Salmon Pond  
Peculiar Hill (shed 1848)  
Bear's Bay  
Shallow Bay  
NATIVE PT.  
Good Water  
WALRUS I.  
Bell Island  
Gore I.  
Mt. Minto  
SEAHORSE PT.  
SMALL LIMESTONE

Very low and dangerous

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SAFETY COVE  
LION INLET  
CA. MARTINEAU  
WINTER I.  
THOMSON  
CAPE WELSFORD  
CAPE BYLOT  
CAPE COMFORT  
CAPE FISHER  
ME MURDO PT.  
"GORE I."  
TERROR PT.  
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STATUTE MILES  
0 5 10 20 30 40 50

FOX  
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SOUTHAMPTON ISLAND  
SOUTH BAY  
SHALLOW BAY  
CORAL HARBOR  
SALMON POND  
PECULIAR HILL (Used 1890)  
BEAR I.  
NATIVE PT.  
WALRUS I.  
SMALL LIMESTONE

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NATIVE PT.  
WALRUS I.  
COATS I.



main portion of Southampton Island, although a deep indentation and intervening low land give it an insular appearance. A point of land projecting from the north shore of "Bell Island" has also been erroneously termed "Gore Island."

Perhaps the most important feature of this map is the charting of the south shore and the locating of a very good harbor at the head of South Bay, which, because of the peculiar red "coral" that was frequently brought up by the lead in taking soundings, I have named "Coral Harbor." In heading up this bay it is well to keep to the west shore, but when nearing the north shore, bear to the east between two islands and follow a course E. S. E., passing south of Guard Rock which lies at the south end of a reef making out from the north shore (Seal Point). This rock lies in water eight or nine fathoms deep and is covered at high tide. I judged the tide to rise about eight feet at this point. After passing Guard Rock, one may proceed in a northeasterly direction, finally anchoring in six or seven fathoms of water. Several islands not shown in the map lie along the north shore of this harbor, which is about seven miles in width.

As one approaches Southampton Island from the west, a distinctly stratified limestone is discernible. A long, low mountain range, in altitude about 500 to 1,000 feet, and broken in two places, stretches across the northeast coast bordering Fox Channel, and presents a barrier to the chilling blasts from the north. From the granite foothills an irregular limestone plain extends towards the west and southwest. Near Manico Point and Cape Kendall is the highest land on the west shore, the hills rising to a height of 150 to 200 feet. Two hills, of a peculiar shed-like appearance, are seen, one at the entrance to South Bay, the other near that of Coral Harbor.

A thorough survey of the southwest shore resulted in the making of certain very radical changes in the coast line, as may be seen by comparison with previous maps, and I hereby desire to name the newly discovered point of land (which lies between Manico Point and the above-mentioned hill at the entrance to South Bay) Cape Low, in honor of Mr. A. P. Low, Department Minister of Mines, Ottawa, Canada.

During the summer the island is entirely free from snow, with the exception of a few drifts on the mountain sides. From the middle of July to the middle of August the air is filled with innumerable swarms of mosquitoes, which make life unbearable to



other than the natives. The Eskimos, however, minimize the annoyance by allowing the hair to grow long and switching the face by keeping the head in constant motion. During the warm weather the bear and caribou seek the cooler places among the mountains. The low lands produce an abundance of grass, waving in the winds like the wheat-fields of the temperate zone; in the higher altitudes, of course, there is less vegetation—sedges border the ponds.

From Native Point north to the foothills, a distance of 15 to 20 miles, the land is very low and the bays are shallow. Water-fowl frequent these shallow waters, and in the summer season are taken by the Eskimos, who use snares made of whalebone. Salmon trout are also found in certain of the ponds in great abundance. Remaining in the ponds and streams until the summer freshets take place, the trout migrate in July to the sea, where shrimp are plentiful. They return in six or eight weeks in fine condition. The spawning season occurs late in September.

The Southampton caribou differ in size somewhat from those of the mainland, but so far as the writer knows, a complete specimen has never reached the hands of the scientist, and the species, therefore, remains to be described. Wolves are not numerous, and, of late, the same is true of the arctic fox.

As the island had not been inhabited since 1903, in the summer of 1908 I left the greater number of my natives (Eskimos from Repulse Bay) on Southampton Island, hoping that they might procure a quantity of fox-skins, but on my return in 1909, I found, to my surprise, that they had taken but few. The scarcity of these animals is accounted for by the fact that ordinarily they gather around the native settlements and feed upon the refuse of the chase. The small temporary encampments of 1908-1909 probably were not sufficiently alluring to attract numbers of these predatory animals.

Although, as above stated, Southampton Island is apparently of little importance from a commercial standpoint, it has great interest for the ethnologist.

When, in 1896, I first met the natives of the island, they numbered about seventy, and as our boat approached the island near Manico Point, the men and children followed along the shore until we found a landing place. They made short, high jumps and called out in imitation of the great loon, "Whar whee! Whar whee!" an expression which they always used to denote appreciation and pleasure. The Eskimos from the mainland on board my vessel

assured me that the presence of the children was an indication of good will, and as we were particularly anxious to make certain inquiries regarding the whaling prospects, we decided to go ashore. The island Eskimos (known as the Saglernmiut—miut meaning tribe) led us to their houses—seven in number and located near the coast—the first of the kind that I had ever seen, since the Eskimos of the mainland live in snow houses and skin tents, very different in structure from the dwellings of the Southampton natives. It is true that on the mainland there are ruins of the same type as those found on the island, which show great age—indeed, the natives of the mainland have no knowledge of the remote times in which they were occupied.

The island huts we found to be circular in shape, skilfully constructed of limestone and built partly under ground. The roofs consisted of a framework made of the long jaw-bones of the whale, the inner ends resting on a king post; upon these bones were flat limestone blocks, and over these a layer of sod. Light was let in through an opening above the entrance, over which was drawn a piece of translucent parchment from the intestine of the seal. The entrance was partly under ground and very low, and usually served also as a drain. Lockers and chests for the storing of materials were numerous, being neatly made of limestone. Some were let into the sides of the houses and others were built underneath the sleeping places. In the summer the sod and stone houses were abandoned and skin tents temporarily erected in the neighborhood.

The Eskimos of my party (which, as stated above, were from Repulse Bay, not more than a hundred miles distant), found it difficult to make themselves understood, for while the dialect is similar, the intonation is quite different. The women, however, grasped our meaning much more quickly than the men. One young man pointed with pride to his house and said that it was his now, as his father was dead. The significance of his pride will be the better appreciated when it is known that any person who is sick unto death, if possible, is moved immediately into the open to die, since the occurrence of death in any house causes its abandonment. The young man felt that he should be commended for so arranging the death of his father as to leave the family estate unencumbered.

There are several traditions current among the natives as to how Southampton came to be inhabited, and I recite the following, as it seems to give a reasonable explanation of the original settlement.

In the long ago, two young men went hunting together, and as

one never returned, it was believed that he had been slain by his companion in order that the companion might marry the widow. But this woman, upon the advice of her friends, killed the slayer of her husband, and fearing that his relatives might then seek revenge on herself and family, she harnessed the dogs and hurried away in the night over the ice. When daylight came the refugees found that they were indeed pursued, and the mother, who had great power as an "Anticoak," caused the ice to crack and open between them and their pursuers, thereby saving them from their enemies. They kept steadily onward in their course, finally reaching Southampton Island, the land of their adoption.

An incident of recent occurrence would tend to show the origin of this story: in the spring of 1904 a party of sixteen natives were sealing on the ice in Repulse Bay, when the ice broke up and carried them to Southampton Island. A year later I happened to land at Duke of York Bay, and hearing of their wish to return to their former home, I brought them back to the mainland.

That the first inhabitants of the island came from Gore Bay and Lyon Inlet, across Frozen Straits, is very probable, although their dress would indicate that they were of the eastern Innuits.

A story is told by the old people of the Aivilik tribe that long ago there lived south of Wager Inlet a tribe known as the Nuvukmiut. (This tribe was exterminated later by the Aivilik, under the leadership of Oud Lin Uke, a famous warrior.) During the winter, when the ice stretched firmly across from the island to the mainland, a party of five Southampton natives walked over to the Nuvuk settlement, where they were met by an equal number of men from that tribe, each carrying a spear. They at once engaged in friendly combat, during which one of the Southampton men was wounded. He called to his father, who reassured him, saying that this encounter would establish amicable relations between the two tribes.

The Aivilik further relate that during this visit one of the Saglernmiut saw a "six six," or ground squirrel, sitting on a rock, which began to chatter as he came near and then ran away and hid. Having never seen any of these animals, the man thought that it was one of the Guardian Spirits of the Nuvuck, until it was explained to him that the species was common in that country. Later the Saglern returned to their own island, and so far as is known, this was their first and only contact with the mainland Innuits.

The Southampton natives related to the Eskimos of my party

that formerly they had passed back and forth northeasterly between what is known as "Bell Island" and Kings Cape, the natives of the latter place being called the "Secoceilyermiut" (*i. e.*, ice goes away, or the shores where the ice is kept moving by the currents). It is also said that the last man to go over to Kings Cape never returned, and it is thought that he was killed.

The little knowledge that we have of the Southampton natives may be due to the fact that until the discovery of Coral Harbor no safe place of anchorage was known. On the south and west shores of the island a boat which lands at high tide has to remain until the tide rises again. One of the best places to approach is just south of Coral Harbor at Native Point, which portion of the island also furnishes one of the best camping places. Here a boat can land on either side of the Point, but the south side is preferable, owing to a lagoon which occurs there in which a small boat may remain in perfect safety. The houses on this point were the last to be occupied by the Saglernmiut.

That they were a fearless people is evidenced by the numerous head-bones of the whale which are to be found in the construction of their houses. For an Eskimo in his frail kayak to attempt to capture a whale with the primitive implements which they manufactured meant great courage, although it is probable that, in general, only small whales were taken. In the summer the natives ran out on the ice and harpooned the whales without using a boat, which, of course, involved but little danger.

One of the natives whom I knew quite well was called "Cumercowyer" (*i. e.*, could see the whale under water). When he died he requested that his body should be placed on the ice so that later it would drop into the sea. At the same time he charged his people that when they went off on the ice or in their kayaks for whales, they must throw a piece of meat into the water and call on his spirit to aid them. He promised that he would hear their call and come to their assistance. Being a friend of "Cumercowyer" I also was supposed to throw over a piece of meat and invoke his spirit to help us in catching our whales.

In hunting caribou, the natives crouch down behind a ridge of stone which they prepare, and there they lie in wait, having first placed a bird-skin covering over the head.

As we had been quite successful in taking whales around the island, a station was erected in 1897 between Manico Point and Cape Low, where one hundred and twenty-five natives from other parts

of the bay were landed. All were well supplied with guns, and also with good boats and sleds, with which the Saglern, who had hunted over the ground for centuries, could not compete. The station proved a failure, and when it was removed to Repulse Bay in 1903, only one woman and four children went with it, the sole survivors of a once numerous people. They were adopted by the Iwilic of Repulse Bay, and when, in 1908, I left a colony of about seventy Aiviliks on Southampton Island at a point north of Cape Kendall, among them were two surviving children of the Saglern-miut—too young, however, to remember the traditions and customs of their people.

Before closing this article, I feel it my duty to call the attention of all governments that are interested in the whaling industry of Hudson Bay and Straits to the need of some uniform legislation which will restrict the indiscriminate slaughter of these animals. I am speaking as one who has had years of experience, and I do not hesitate to predict the early extermination of the whales in these enclosed waters unless some restrictive measure is adopted. During the summer months, whales, seals and the abundance of terrestrial animal life add so materially to the interest of the country, that it would be a public calamity for the zeal of those commercially interested to destroy these features of its attractiveness.

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## TRADE ROUTES IN THE ECONOMIC GEOGRAPHY OF BOLIVIA\*

(Continued)

BY

ISAIAH BOWMAN

Assistant Professor of Geography  
Yale University

ARGENTINA-BOLIVIA.

The Antofagasta railway, ever since its completion in 1892, has been the sole means of rail transportation to southern and central Bolivia. This position it will soon lose as work on the new line is now completed to the Argentine frontier at La Quiaca and a recent understanding between Bolivia and the Argentine Republic provides

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\* See *Bulletin*, January, 1910, p. 22.

for its extension to Uyuni by the latter country at an early date. The line follows in the general direction of the old mule track into Bolivia, one of the most famous of the early South American roads. The mule track runs for much of the distance along the water-courses, naturally graded and firm roads in the dry season, but impassable when the streams are in flood. Over this route came a



FIG. 10. LANDING FREIGHT AT ANTOFAGASTA.

Cargoes are unloaded from the lighters by cranes or carried on the backs of workmen.

portion of the goods supplied to Argentina, via Panama, in the days when that port enjoyed a trading monopoly of all the goods sent to Spanish America. Later, when importations came via Buenos Aires, caravans began regular journeys into Bolivia bearing merchandise of cloth chiefly, besides important quantities of tea, spices, jewelry and the costlier varieties of hardware. For these,



were exchanged the silver, blankets, dried and hence light-weight potatoes, and the coca, of the mountain Indians. It is interesting to note that a large part of the exchange is by barter even to this day, though purchases were made outright, from the first, owing to the lack of plateau products of sufficient amount to balance the Argentine trade, and the large quantities of tin and silver the plateau has always produced, which in both its stamped and unstamped condition has served as currency among the traders.

Great quantities of goods go over this trail to-day and the quantity is steadily increasing as the progressive northerly extension of the road reduces, by corresponding amounts, the high freight charges for mule transportation. The goods are now shipped cheaply by rail to the Argentine border and thence go by freight coach or pack mule 175 miles to the railroad at Uyuni. They are then available at any of the stations as far as Oruro and La Paz. At Challapata the goods may be shipped by mule cart to Sucre and at Oruro by freight coach or caravan to Cochabamba. Italian traders among others make this journey with cloth goods ranging in quality from cheap woollens to expensive silks. Orders are not taken to be filled later, but the traveling salesman brings his entire stock with him and when he is sold out returns for another consignment. The annual fair at Huari, 60-70 miles south of Oruro, also witnesses a great movement of goods over the old road. For a time, trade over this route fell off, notably on account of cheaper shipping facilities over the Antofagasta route\* but the road from the south has been extended so far that the current of trade from this direction is now regaining its old-time force.

The distinctive quality of the completed road will be its connection with an Atlantic port. Its advantage over the Antofagasta route for both European and American shipments of the tin, copper and silver of Bolivia will be considerable and will continue to be so until the completion of the Panama Canal, which it will undoubtedly antedate by at least several years. What this advantage will be may be appreciated by a comparison of distances. The significance of these is emphatic not only for Bolivia, but for well-nigh every section of South America because the energy of the country is still almost wholly devoted to the extractive industries and hence products are disposed of in the Atlantic countries of the northern hemisphere, and manufactured wares are desired from the same source. From Uyuni to the coast, via the Antofagasta line, is 300

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\* Hoek, H., *Exploration in Bolivia*, *The Geog. Journ.*, vol. 25, 1905.



miles and to Buenos Aires, via Jujuy and Tupiza, is 1,100 miles. But at these ports, the ore is 11,000 miles and 7,000 miles respectively from Liverpool. The Panama Canal would change these relations and give the Antofagasta line the advantage of one-third the number of miles of land haul and an ocean voyage of but 4,500 miles to reach New York, though in comparison with shipments to Liverpool this advantage is lessened to approximately 1,000 miles.

Besides these advantages are those arising from the mineral wealth along much of the mountainous section of the line and the abundant agricultural products of Jujuy and the irrigated valleys adjacent which have awaited their best development for years until the completion of this outlet to the seaboard. Branch lines are being taken up slowly to the rich borax and nitrate deposits of the arid northwestern section of Argentina (those to La Rioja and Catamarca are already completed) and the deposits of copper and tin that occur there. (Fig. 12.)

#### PLATEAU-PLAINS.

The various projects of the railroad development of eastern and central Bolivia are so intimately associated with each other that a general description of the circumstances leading up to the present activity seems desirable.

In 1904 there was signed at Petropolis, Brazil, a treaty\* between Brazil and Bolivia for the settlement of a boundary dispute involving the territory known as "Acre." The land in question came into dispute through the influx of large numbers of Brazilian rubber gatherers and exploiters who found the then rich rubber territory in the valleys of the Purus and Aquiri, tributaries of the Madeira, but little developed by Bolivians. After a complex series of events, one of which was the formation of a new but short-lived "Republic of Acre," the difficulty was overcome by the treaty of Petropolis, by the terms of which Bolivia quit-claimed its right to 73,720 square miles of the disputed territory for £2,000,000. Bolivia acquired a valuable triangular-shaped district of 886 square miles between the Abuna and Madeira rivers and four other small pieces of land aggregating 335 square miles on the western bank of the Paraguay. In accepting the £2,000,000 for her lost territory Bolivia recorded her

\* Daily Consular and Trade Report, No. 2987, Oct. 2, 1907. The Acre Territory and the Caoutchouc Region of South-western Amazonia, by Col. G. E. Church. *Geog. Journ.*, vol. 23, 1904, pp. 596-613.

New Boundary between Brazil and Bolivia. *Bull. Am. Geog. Soc.*, vol. 36, 1904, pp. 215-216.

Survey Work on the Frontier between Bolivia and Brazil, Maj. P. H. Fawcett, *Geog. Journ.*, vol. 33, No. 2, Feb. 1909, pp. 181-185.

intention of applying the money principally to the construction of railways and other works tending to better communications and to develop commerce between the two countries. Other provisions of the treaty are of almost equal importance as the basis of the present movement of goods and as improvements designed to facilitate commerce. There is to be perfect liberty of land transportation and river navigation for both nations. Brazil agreed to build, within a period of 4 years, the Madeira and Mamoré railway from San Antonio, at the lower end of the series of falls on the Madeira, to Guaya-Mirim, on the Mamoré (one of the two main affluents of the Madeira, the other being the Beni) with a branch line to Villa Bella in Bolivia; and both countries are to be admitted to equal privileges and tariffs with respect to it. While the terms of the treaty have not been carried out to completion by Brazil in the time designated, a beginning of the line was made by the granting of a concession in 1906 to an American syndicate to construct port works at Para (Belem) at the mouth of the Amazon river. It is true that before this, i. e., soon after the signing of the treaty of Petropolis, the Brazilian Government granted a concession for the construction of the Madeira-Mamoré railway. The concession was granted to a Brazilian as against an American syndicate and French capital was secured to work it as a Brazilian concern. Nothing came of these activities, however, and the real beginning of the line dates from the purchase by an American syndicate of the Brazilian concession and the acquisition of the Para concession as well. It is understood that Mae, Jekyll & Co. are the promoters of the enterprise and that actual work is progressing rapidly. A party of thirty men under charge of H. C. Miller, at one time chief assistant in a Nicaraguan Canal survey, are actually engaged in the preliminary work. Warehouses, workmen's cottages, and even a cold-storage plant have been constructed; and about 40 miles of the new line are now complete.\*

Quite apart from the interest that attaches to the commercial importance of the line is the widespread popular interest growing out of the construction of a railway in the depths of the Amazon forest over the same ill-fated route that marked the failure of the Collin's scheme of Philadelphia, in the late '70's, and that resulted in one of the most tragic episodes of modern industrial history.‡ Only

\* *Bull. Internat. Bureau Am. Republics*, Jan., 1910.

‡ Recollections of an ill-fated Expedition to the Headwaters of the Madeira River in Brazil. N. B. Craig. 1907, pp. 479, and map.

a few kilometers of rails were actually laid and no trade whatever was or is served by the line as finally abandoned. The falls of the Madeira remained the same stern obstacle to trade as formerly and Bolivia's dream of a highway to the Atlantic was rudely shattered, first by the failures in the construction work, and finally by the perfidy of the financial agents of Bolivia at London.

The two fundamental considerations in the estimate of the value of the Madeira route and the importance of the railway are, first,



FIG. II.

Native mining works at Huynuni, Bolivia. At this locality very modern reducing works are also located, the ore being shipped by mule cart thirty miles to the railway. Heavy machinery is brought in, in the same manner.

the character of the route as a highway, i. e., the physical layout of the region; and, second, the nature and amount of the products to be secured. The map, fig 4, represents the territory involved in this discussion and at once emphatically indicates the most important fact in the physical geography of the region, the convergence of all the river ways upon the Madeira above the falls. From Cachuela Esperanza on the Beni and from the falls of Guaya-Mirim

on the Mamoré, 500-700 feet above sea level, there begins a line of rapids, varying in height and number with the height of the water, but there are never less than eleven, and they cover a stretch of river 229 miles long. They thus constitute a trade obstruction in the very throat of tropical Bolivia. The real significance of the obstruction is better appreciated by realizing that the falls occur from 300-500 miles from the base of the Andes, as the crow flies, or probably over  $2\frac{1}{2}$  times that distance by river course. They are not, therefore, on the edge of the tropical plains, but well within them. This fact alone would make them a serious impediment to traffic even if there were but a single main stream with few tributaries. But with these great affluents converging their waters and their commerce to the Madeira, the obstruction becomes a nuisance, an actual barrier to the commerce of all eastern Bolivia from its northern boundary to Sucre and from the altiplano to the eastern limits of the Republic.

The river freights are transported about the falls on land by means of rafts, canoes and batelons.\* Goods are occasionally stored at San Antonio for months at a time awaiting transportation upstream, the number of canoe-men being always limited and often unobtainable. Boats that attempt to run the rapids at high water are sometimes successful, but the safer, though more tedious and costly way, is to unload the cargo and laboriously drag it around the principal falls. These are eleven in number. At six of the eleven the launches have nearly always to be passed overland, a total distance of 13,889 feet. There are five rapids where the launches must be unloaded and towed with ropes, a total distance of 12,628 feet. These figures total five miles of distance where the freight must be unloaded and carried overland. All the remaining rapids are difficult of transit where loaded craft shoot with the current or are dragged upstream near the river margin.†

What this drawing away of the Indian from agricultural or other productive labor means in a region where labor has always been scarce and expensive and what this means under the severe tropical conditions prevailing there may easily be inferred. In some cases the batelons are skidded around the falls over a corduroy of round, easily-rolled young timber. Col. Church states that the cost of transporting goods past the falls of the Madeira is no less than £85 per ton. Were chocolate and rubber less precious commodities

\* Several ton barges, strongly constructed.

† The Route to Bolivia via the River Amazon. A Report to the Governments of Bolivia and Brazil; G. E. Church, London, 1877, p. 183, *et seq.*

or less indispensable luxuries to the people of the temperate zone they would never be able to bear the tax the falls levy upon these already expensively gathered products. As the trade of Caupolican Bolivia, the Yungus, and the Mojos, totals several million pounds sterling a year the tribute levied by the rocky obstructions and reefs is little short of enormous.

As for the products of the region which go down river and will feed the Madeira-Mamoré railway, they are to-day chiefly rubber, with some chocolate and hides, but the ultimate resources of the region, the limits of production, no one can estimate. Even to-day, difficult and expensive as transportation is, either up or down river, cattle grazing is an important industry on the grassy plains between

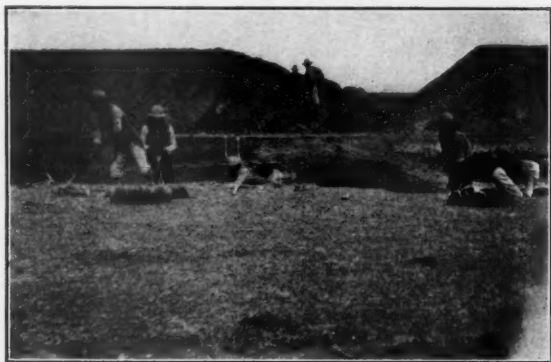


FIG. 12.

Workmen grading the road bed between Oruro and La Paz (1907). Wheelbarrows are provided, but the Indians prefer to use their blankets. Each Indian must work fifteen days on the road at thirty cents a day.

Villa Bella, Reyes and Trinidad, and even as far south as Santa Cruz in Bolivia; while in Brazil and Paraguay the cattle-raising district extends still further south. The grassy plains between the lower Beni and Mamoré are the northern limit of the grass lands in Bolivia and are now scarcely touched by the limited stock of the region. The herds supply meat for the residents of the districts, hides for shipment and draught animals for the ox carts that, slow, uncertain and expensive, are notwithstanding, almost the sole means of transport away from the rivers. At present the downstream trade in hides is very slight, the bulk of the cargoes going upstream to La Paz and the Pacific coast. Cheap downstream transportation

would mean a vast development of the cattle industry which requires but few laborers, a primary desideratum in this notoriously laborless land where the rubber industry itself would languish were it not for the system of enforced labor or peonage practised here almost universally. Not only would the hides find a profitable market in the leather establishments of the temperate zone, but the meat as well would be a source of great profit. Para and Manaos, particularly the latter city, which is only 600-700 miles from Villa Bella, could be supplied from the Bolivian llanos with fresh meat by transport boats of suitable pattern instead of being largely supplied with tinned meat from the United States and Europe, as at present. What a railway upstream to La Paz or Cochabamba would mean to the cattle industry may be gleaned from the fact that at Reyes, in north central Bolivia, a steer out in the field is said to cost 50 cents gold, tied to a stake \$1.25, and driven to La Paz and sold for meat \$35.00, if he survives the arduous journey of many score miles over a difficult trail.

Notable quantities of rubber and chocolate are likewise shipped upstream over the same routes via La Paz, Cochabamba and Oruro to the Pacific coast. These are return cargoes carried back more for the saving they effect on the merchandise that constitutes the downstream freight than for the freight earnings that the expenses of the uphill movement of goods often more than consumes. For it is a curious fact that Trinidad, Villa Bella, Santa Rosa and many other towns of this region acquire their supplies of merchandise largely from the west. Canned goods, cloth, iron and steel utensils, salt, tobacco, flour, potatoes, liquors, shoes, etc., are brought, some from the United States, via Panama, some from England, Germany and France, via the Straits of Magellan and taken over the Antofagasta or Mollendo railways to Oruro or La Paz. If to La Paz, they must be taken a two-days' coach journey to Sorata and so by pack animals to the Beni or the Mapiro; if to Oruro, by freight coach to Cochabamba and by caravan a journey of one to two weeks (depending on the state of the roads), to Santa Rosa at the head of canoe navigation. From this point on transport is easy. Indeed, the only seriously difficult part of this route from the shops of England, say, to the stores of Trinidad on the Mamoré is the one to two weeks caravan section from Cochabamba to Santa Rosa. The wet season may make the streams impassable between Cochabamba and Oruro, or the trail a bog-mire between the former city and Santa Rosa, but these are only short-lived difficulties. Several





*Photo by Brooks.*

FIG 13.

The true mountain character of the lofty ranges that form the core of the great Bolivia Andes is indicated here. It represents a portion of the Nevados de Anca at about 17,500 feet, or the level of the snowline.



Cochabamba merchants make this downstream trade a special business and are able to supply their goods more cheaply and more certainly than those merchants who import via the Amazon and the expensive falls of the Madeira. There is thus a zone in the Madeira valley in which costs, via the Amazon route and the falls of the Madeira, and costs, via the Magellan and Pacific route, approximately balance. The balancing point appears to lie within the falls zone.

This fact alone expresses well the severe tax the falls are upon transport as compared with expenses elsewhere in the journey. Where they are not so high, the pivotal point would, of course, depend on the relations of the more obvious factors of long ocean voyages, launch service and railway, and caravan transport. Very little plateau merchandise finds its way to San Antonio and likewise only small amounts of San Antonio goods are ever carried to Trinidad and Villa Bella. With the falls railway completed this pivotal point will be moved well up toward the head of launch navigation on the affluents of the Madeira, if, indeed, not to the very base of the Andes. It may even be that, with the completion of the Madeira railway and of the cart roads now building northeast of Cochabamba and north of La Paz, many of the villages on the eastern Andes may be supplied by up-river rather than over-mountain routes. (Fig. 13.)

Most of the rubber, chocolate and hides now shipped upstream and finally via Oruro and La Paz to the Pacific coast is curiously transported as to direction. The chief cause for these trans-Andine shipments is not a cheaper route, for it is, of course, a much more expensive route than the downstream one to Para, but merely that the canoes, and batelons, returning with difficulty against the current, from Trinidad, after disposing of their cargoes there, can more profitably bring light return cargoes than none at all and similarly the mules of the eastward moving caravans are hired for the round trip, not for the outward journey alone, and some return cargo is here likewise demanded. Merchants in Cochabamba, Oruro and La Paz are often paid for their imported merchandise in this way with the currency of the plains: rubber, chocolate and hides, from the upper Madeira.

It is doubtful even to the most optimistic student of Bolivia's resources whether the dream of numerous railroads penetrating to the eastern foot of the Andes (Fig. 11) will ever be an accomplished fact, except at a few highly strategic places. The traffic will scarcely bear more than two such lines in all the great stretch of

country between the Beni and the easternmost counterfort, or spur, of the Andes at Santa Cruz de la Sierra. The two principal mule trails to tropical Bolivia are from La Paz to the Beni and from Cochabamba to the Chaparé and one or the other of these will undoubtedly be the locus of ultimate railroad activity. Such railways, by penetrating to the head of navigation on either of these two streams, could at once command by auxiliary launch service the traffic of the whole of a single great tributary. From the standpoint of such a railway the gravest defect of the physical geography of the tributaries of the Madeira is the existence of falls in both the Beni and the Mamoré, unfortunately just about their junction to form the Madeira. Were these eliminated, both streams would by launch service contribute their products to a single railway built to either stream. It is certain that the defect will delay railroad building many decades, if not centuries. The most reasonable solution that suggests itself is that the Beni territory will ultimately be served by a trans-Andine railway while the next southerly road will be to Santa Cruz and the Paraguay. From such trunk lines branches could then be extended along the eastern foot of the mountains and would likewise put the Mamoré basin into touch with rapid and cheap means of communication.

No one can fail to see the stimulating effect such a railway would have upon the eastern Andes. Few now unoccupied districts in South America would seem destined to an ultimate development greater than that of the eastern Andine valleys and the plains tracts adjacent. There one may find elevations and temperatures to suit every purpose and every constitution. No more delightful spots can be found in all tropical South America than here: suitable and relatively constant thermic conditions, sufficient rainfall, yet not a burdensome excess, timber for construction, rich products of field and garden and mine. The resources of the region are scarcely touched to-day. The eye roams over hundreds of square miles of delightful country with only the most insignificant scattering of agricultural folk. The necessities of life, the bananas, oranges, potatoes, meats, etc., are gained almost without effort; the luxuries, such as good tobacco, utensils of house and garden, and fine clothes, require but the most ordinary and limited attention to the cultivation of the coca tree and the curing of its leaf. Except for transport, partly on the backs of human carriers, of the coca leaf—the currency of the region—life is easy, tranquil, bountiful. The equalization of eastern tropical valley and plains products on the one hand and the plateau products on the other is now but feebly ac-

completed by a system of weekly fairs, of which that at Cliza, 30 miles southeast of Cochabamba, is undoubtedly the largest and most interesting. Every Sunday thousands of vendors from an area 50 to 70 miles in radius gather for barter and sale. Fruits and grains and cattle of the fertile Misque valleys and even sugar and rice from Santa Cruz are here gathered for exchange with the potatoes and barley and silver of the plateau Indians. It is one of the greatest trading pageants of all South America to-day. (Fig. 14.)

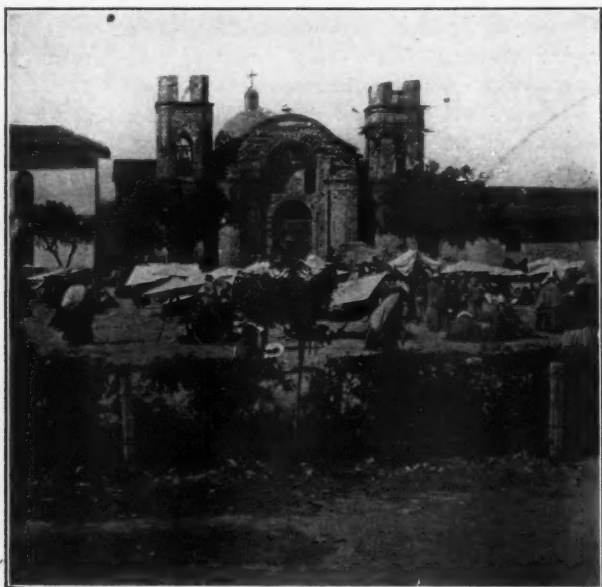


FIG. 14.

Market day and the principal plaza at Sacaba, Bolivia, near Cochabamba.

The town of Huynuni illustrates trade features similar to those at Cliza. It is 20 miles within the western edge of the eastern plateau, near the headwaters of a stream tributary to Lake Poopó. The elevation of the town is 13,000 feet and only barley and potatoes, llamas and sheep can be produced. The vegetables and other desired foods are imported from the valley of Llurivayi and others, 30 or 40 leagues east of Huynuni and at an elevation of 8,000-10,000 feet. It requires the greater part of a week to make the journey. There are regular market days sometimes once, some-

times twice a week in which the local vendors, in little booths, dispose of the cargoes. Purchases may be made on other days, but the stuff is apt to be inferior. One finds the market stocked with every variety of product—cabbages, lettuce, carrots, potatoes, oranges, many kinds of seeds, onions, salt, sugar, apple, peas, peanuts, meats, etc. Antequera, a mining town 7 leagues southwest of Huynuni, and numerous other mining centers in the plateau, are supplied in the same way from the eastern valleys.

For railroad, as for industrial purposes, the region possesses one unrivalled resource, its water power. Were the dynamic energy in the headwaters of Bolivia's streams properly utilized to-day there would be generated sufficient electrical power to run every railroad train now operated in the Republic, every one ever to be operated, every factory, every mine. It needs but a little attention to the subject to see that man has only to install a very few hydro-electrical plants, in strategic places, to carry goods easily up the different grades by the now unused waters that run down those grades. If it be argued that the limited commerce, as now developed, will not bear the expense, it is only necessary to point to two inevitable benefits: first, the enormous stimulation to production that such cheap and easy transportation would effect; and, second, the transference of electrical power from the eastern Andes to the central plateau is one of the sanest present-day possibilities and would at once eliminate that great expense of the plateau railroad, coal. The coal now burned there costs \$20 to \$30 per ton and the rate is ruinous. Bolivia's coal resources are practically nil. She must continue to import coal whose cost even at the centers of population is bound to suffer rapid increase in the near future. The water power of the Loa valley in Chile, generated at almost negligible expense, is now the substitute for expensive coal at Santa Fé, one of the greatest nitrate establishments in Chile. In Mexico a cable 110 miles long conveys the energy generated at a waterfall to mines near Durango. A dozen hydro-electrical plants in the United States generate power that is conveyed over comparable distances. There are, within 70 miles of Cochabamba, no less than a dozen never-failing streams, any one of which would carry the freight and passenger traffic and do the business of a city of 1,000,000 people. It is the folly of the industrial age that these sources of power should lie untouched in the very region where one may actually see Indian carriers bringing rough-hewn planks of tropical cedar wood laboriously on their backs, a week's journey over one of the most difficult trails in existence, to forestless Cochabamba

for the purpose of making furniture! What Bolivia needs to supply power and bring the products of the plains to her more densely inhabited plateau is not a great coal deposit, but dams. Coal deposits are exhaustible, but the water power of Bolivia's magnificently watered eastern slopes is as permanent as the slopes themselves, and while one in a geologic sense may describe these as ever-changing, in an anthropogeographic sense they are eternal. Anyone who sees in the lack of wood on the altiplano of Bolivia, and in the lack of coal throughout the Republic generally, a fundamental

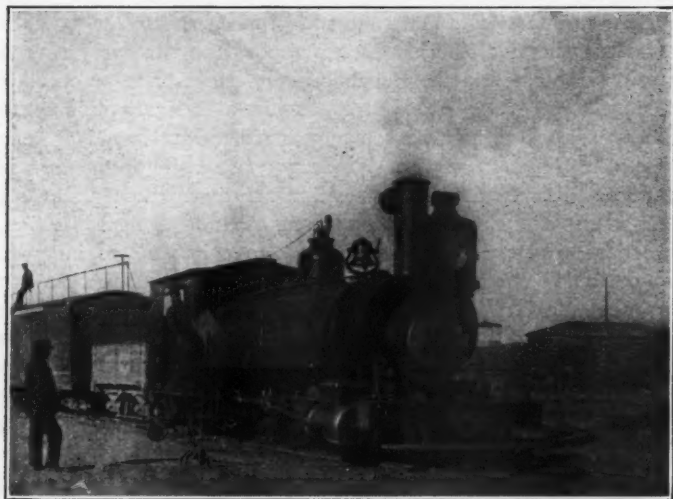


FIG. 15.  
Type of locomotive and freight car employed on the Antofagasta-Bolivia R. R.  
(meter gauge), 1907.

defect for any future industrial Bolivia is blind to the clear facts of easily accessible water power and its realized possibilities in other lands. The heavy machinery required for electrical plants of adequate size would be difficult of transport away from the railroad, but it can be made in lighter and more feasible units whose transport would be relatively easy of accomplishment. If pianos can be taken to Sucre and heavy rice threshers to Cochabamba, surely dam and dynamo equipment can be taken to sources of water power of such enormous importance and amount. (Fig. 15.)

*(To be concluded)*

## THE NEW STAR IDENTIFICATION TABLES OF THE HYDROGRAPHIC OFFICE

BY

G. W. LITTLEHALES

The United States Hydrographic Office has just brought out, as a result of extensive and laborious computations, a convenient and important work in recognition of the value of observations of the stars and planets for the purpose of ascertaining the compass error and the geographical position of ships at sea and of the necessity of employing such observations in consequence of the increased speed of vessels employed in ocean transit. With every attempt to make ships go faster and get farther in a given time, greater frequency in determinations of geographical position become more important, because the reckoning of ships is rendered more and more uncertain, by the diverting forces of the elements, in proportion to the distance traversed from the latest ascertained position.

The navigator, able only to find his ship's position and the error of the compass by observations of the sun, has, therefore, but a limited and consequently, imperfect command of the art of navigation. In these days of keen competition, when the difference of a few tons of coal, or a few hours in the length of passage, may mean all the difference between profit and loss, or between safety and disaster, he must recognize the great advantage and extreme importance of employing also in his service the stars that "rule by night."

Sir John Herschel said: "Every well determined star, from the moment its place is registered, becomes to the astronomer, the geographer, the navigator, the surveyor, a point of departure which can never deceive or fail him, the same forever and in all places, of a delicacy so extreme as to be a test for every instrument yet invented by man, yet equally adapted for the most ordinary purposes; as available for regulating a town clock as for conducting a navy to the Indies; as effective for mapping down the intricacies of a petty barony as for adjusting the boundaries of Trans-Atlantic empires."

From remote antiquity, the heavens were mapped out into constellations and groups of stars in which, by the aid of a fertile imagination, some resemblance was traced to the various beasts, birds, fishes, and classical heroes whose names were assigned to them.



The most ancient records allude to the constellations by these distinctive names. In the Old Testament, in the book of Job, we read of the "bands of Orion" and "the sweet influence of the Pleiades"; and in the writings of Hesiod and Homer are names as familiar to the astronomer of to-day as they were to the observer in the ages when science was in its dawn. Besides the designation by name of the most conspicuous stars and of the groups or constellations, the stars in each constellation are distinguished for reference by letters and numbers; and in connection with the name or other distinguishing designation of each of them, astronomers have registered its place in the firmament by measured co-ordinates which are called declination and right ascension and which are somewhat comparable with latitude and longitude on the surface of the earth.

In finding any star in the heavens from a map of the constellations, it is necessary to refer to some one star or constellation as known, such as the Great Bear, also called by the Latin name *Ursa Major*, and then to recognize others in accordance with the configuration of the map; for, by supposing a line to pass through two such known stars, it may also pass through or near another star whose name is required; or by producing a line to a certain distance estimated by the eye, the same end is obtained.

Probably the reason why stellar observations have been so little practiced at sea is to be found in the extreme inconvenience, if not impossibility, of identifying the observed stars by means of star maps or by recognizing the configuration of the heavens. In stormy weather with partly clouded skies obscuring the arrangement of the constellations, the navigator was frequently prevented from recognizing any of the few stars showing at a time and hence from obtaining results at the very times when they might be most indispensable to his safety. How many sights have been found useless because the observer thought he was observing one star when in reality pointing his telescope at another? How many coveted results have escaped the navigator, because, on account of clouds obscuring its neighbors, he could not feel sure of the identity of the one star that was visible?

What the Hydrographic Office has done to relieve ocean commerce of the impediments thus arising is to pave the way for the unrestricted application of the science of astronomy to navigation by providing in simple tabular form the means for converting the altitude and approximate bearing of any star, which the navigator may measure with his sextant and compass, into the corresponding decli-



nation and right ascension, the co-ordinates by which they are catalogued in the lists giving the names and magnitudes of stars. The navigator is thus rendered independent of any previous knowledge of the constellations and the names of the stars he may observe, and, instead of being confined to the employment in his observations of those stars which he may be able to recognize, is enabled to identify any star that is bright enough to observe.

## MAXIMUM, MINIMUM AND AVERAGE HYDROGRAPHS OF THE MISSISSIPPI RIVER\*

BY

ROBERT M. BROWN

State Normal School, Worcester, Mass.

The diagrams presented with this paper represent composite hydrographs of the Mississippi river at five stations and were compiled from the comprehensive hydrographs of the river from the time when the records were first tabulated to the present as printed in the Report of the Mississippi River Commission for the year ending June 30, 1909. In each illustration, the upper curve represents the absolute maximum stage of the river for the location; the lower curve, the absolute minimum; and the continuous line the average hydrograph. Figure 1 portrays the stages at Hannibal, Mo., on the Mississippi river; Figure 2, stages at Hermann, Mo., on the Missouri river; Figure 3, at St. Louis just below the confluence of the Upper Mississippi and the Missouri river; Figure 4, at Cairo, Illinois, on the Ohio river; and Figure 5, at Memphis, Tennessee, where the combined effect of the upper rivers is recorded.

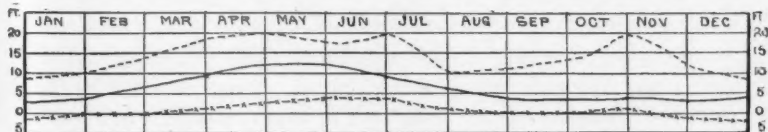


FIG. 1.

Figure 1. Hannibal. 329.4 miles above Cairo. Zero of gage is 469.60 feet above the Cairo Datum plane. These curves are taken

\* Paper read before the Association of American Geographers at Boston, January, 1910.

from the records for twenty years, from 1879 to 1889. The average crest of the flood appears in May, a condition which arises from the Upper Missouri type of rainfall. This crest has arrived as early as the last of April and as late as July 1, and there has been a range of 16 feet during the twenty years. Exceptional occurrences may always arise as is indicated by the excessive height of the maximum curve during October and November. This departure from uniformity resulted from the high water stages during the fall of 1881.

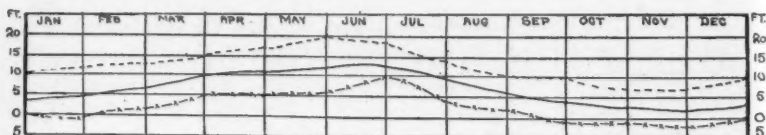


FIG. 2.

Figure 2. Hermann. Zero of gage is 502.17 feet above the Cairo Datum plane. These curves represent the same period of time as that of the Hannibal record. The average crest is seen to appear about June 20, a little later than that of the Upper Mississippi, and this flood is a result of the Lower Missouri type of rainfall. The 1897 season is represented on these curves by the absolute maximum for January 1 and April 1, and the absolute minimum for the months from August until the close of the year.

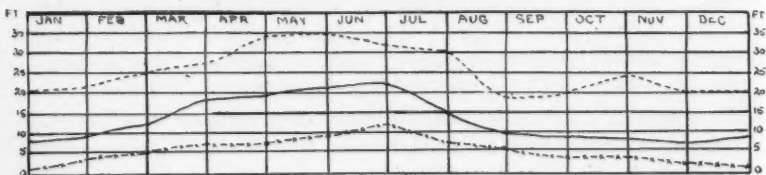


FIG. 3.

Figure 3. St. Louis. 190.8 miles above Cairo. Zero of gage is 400.22 feet above the Cairo Datum plane. These curves cover a period of twenty-nine years, from 1871 to 1899. The crest of the St. Louis flood, which is made up of a combination of the Missouri and Upper Mississippi river floods, is reached on the average during the last of June. In the absolute maximum we have a marked deviation in the October-November portion of the curve which is only in part explained by the corresponding excess in the Hannibal absolute

maximum curve. While the November 1 position of the absolute maximum curve is the result of the 1881 rise on the Upper Mississippi, the October 1 position has for its origin a combination of rises on the two tributary rivers during 1884. The high water of 1895 corresponds nearly with the absolute minimum curve for the months from January to July, and the entire absolute minimum curve does not differ much from the hydrograph for that year.

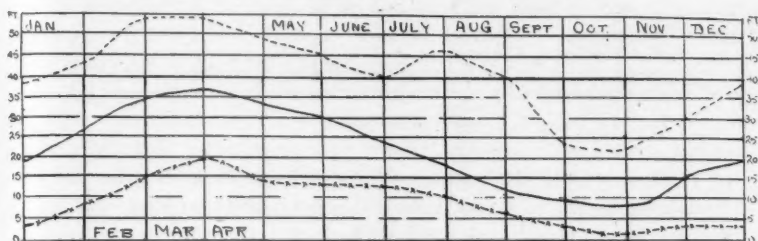


FIG. 4.

Figure 4. Cairo. 1 mile above Cairo. Zero of gage is 290.84 feet above the Cairo Datum plane. These curves cover a period of twenty-eight years from 1872 to 1899. The crest of this flood arrives on the average during March and results from the early winter rains in the Southern Appalachians. The excess in the absolute maximum during August and September is the record of the season of 1875. One other record for August approaches within thirteen feet of the August, 1875 record but no other reaches within twenty-one feet of it. At this station, during the twenty-eight years, the range of the season below average low water mark extends from August 15 to February 1. The 1894 low water season practically coincides with this minimum stage. The beginning of the high water season here may come as early as the last of October or be delayed until the first of January. On the other hand, stages above the average high water mark may be maintained from the last of December until early in September.

This uncertainty of the river stages at Cairo is a reflection of similar conditions among the tributaries of the Ohio, and offers a serious embarrassment to any effort towards impounding the waters in reservoirs.

Figure 5. Memphis. 230 miles below Cairo. Zero of gage is 184.27 feet above mean Gulf level (Cairo Datum is approximately 19.7 feet below mean Gulf level). These curves represent the com-

bination of the floods of the three tributaries on the lower river. Stages below the average low water mark are recorded from the last of July until the last of February, a period of seven months; while stages above the average high water mark are shown from the last

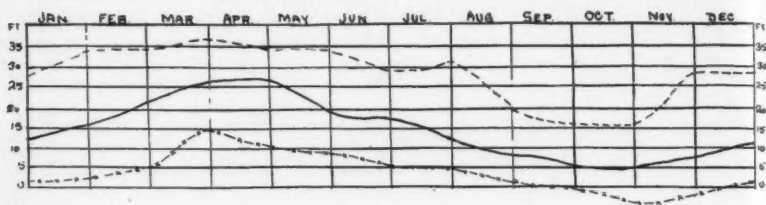


FIG. 5.

of November until the middle of August, over eight months. The lowest stages are recorded during October and November, and the highest during March and April. The high water rise may begin as early as November 1 or be delayed until March 1. A consistent fall in stage during August and September and a consistent rise during March are also recorded.

## RECENT PUBLICATIONS OF THE WEATHER BUREAU

BY

R. DE C. WARD

The new series of publications dealing with the climatology of the United States, issued by the Weather Bureau, includes a number of bulletins. A ten-page summary of the climatological data for Maine ("Section 106," in the new classification), contains a brief account of the "climatic characteristics" of New England as a whole, with special reference to Maine; a series of tables of monthly and annual rainfalls for 22 stations (running back in one case to the year 1837); miscellaneous data, including average number of days with .01 inch or more of precipitation, mean temperatures, highest and lowest temperatures by months, average depth of snowfall, mean relative humidity, prevailing wind direction, and frost data; hydrographic data compiled from the records of the U. S. Geological Survey; a chart showing the comparative monthly distribution of precipitation for certain New England stations, and a map showing the boundaries

of the "sections," with the location of the principal reporting stations, drainage basins and general elevation above sea level.

The summary for "Section 105," which includes New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, is similar in form and contents to that for Maine, just described. The precipitation record for Hanover, N. H., goes back to 1834; that for Burlington, Vt., to 1828; that for New Bedford, Mass., to 1814; that for Providence, R. I., to 1832, and that for New Haven, Conn., to 1804. All of these records, except those for New Bedford and Providence, have some breaks.

Summaries for "Sections" 1, 2, 3, 4, 49 and 87, range from Arizona and New Mexico to South Carolina. It does not appear on any of these summaries, how often they are to be issued, but we presume that they are to be published annually.

The first two numbers of the *Monthly Weather Review* in its new form (July and August, 1909) have also been issued. As has already been noted in the *Bulletin*, the *Review* will no longer contain general articles, of more or less popular interest, but will be confined chiefly to the publication of all the representative climatological data for the country as a whole. These data, grouped under the twelve new climatological districts, are preceded by a short account of the meteorological conditions for the month in question. The data are edited by local representatives familiar with the country, who prepare the monthly summaries made up from notes written by the several "section directors." The *Review* for July, 1909, embraces nearly 150 pages, and is therefore much larger than the old numbers. Professor F. H. Bigelow is in charge of the Climatological Division of the Weather Bureau, and Dr. Cleveland Abbe, Jr., is Assistant Editor of the *Review*. It is gratifying to see the discussion of certain phenomena of special interest during the month of July last, as, for example, of summer hot winds in Oklahoma; of the Texas hurricane of July 21, with a chart of the track of the storm and of the limits of damage, and with views of the Galveston sea wall, which did such effective service in protecting the city. Those who wish to keep in touch with current meteorological phenomena, as well as all persons who for any purpose desire to secure current climatological data, will need to make regular use of the new *Monthly Weather Review*. The librarian of the Weather Bureau, Mr. C. F. Talman, continues his bibliographic notes in the new *Review*.

The August, 1909, issue, is in general similar to that for July, but contains several charts which were not included in the July num-

ber. These charts show the total precipitation and the departures of the mean temperatures from the normal for each district; the total precipitation, the percentage of clear sky between sunrise and sunset, and the sea level isobars, isotherms and prevailing winds for the United States as a whole; and the tracks of anticyclones and cyclones, for August.

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#### EDITORIAL NOTES AND COMMENT

A well-known arctic explorer has written to the Society to ask why two different latitudes are given in some of the best atlases for the highest north attained by Nansen. The fact is that more than two different statements as to his highest north have appeared in authoritative publications.

On April 7, 1895, Nansen's observations showed that he had much surpassed the highest previous record but, in his book, he makes no more account of this achievement than of any other position along his route. The fine map made by Bartholomew for the English edition of the book does not even give the latitude figures of his highest north. The explorer wrote in "Farthest North" that he had reached "about  $86^{\circ}10' N.$ ;" and the English edition of his book adds, in a footnote, that on further calculation, his northmost point was  $86^{\circ}13.6'$ .

Later still, Vol. 2 of Nansen's "Scientific Results" gave  $86^{\circ}12.8'$  as his highest point of observation and added that he walked about a mile further north. Stieler's Hand-Atlas takes this walk into account and gives Nansen  $86^{\circ}14' N.$ ; Andrée's Hand-Atlas gives  $86^{\circ}4'$ , perhaps a misprint; and the last edition of Greely's "Hand-book" gives  $86^{\circ}12'$ .

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Large scale maps showing the distribution of edible shellfish along the coasts of France have been in course of publication, for four years, in the *Bulletin de l'Institut océanographique de Monaco*. The laborious researches they record have been a work of love by two enthusiastic men of science, Prof. Joubin and Mr. Guérin, who hope, in two years more, to complete the mapping of the beds of shellfish on all the French coasts.

They were so fortunate as to secure the interest of a princely



patron who has spared no expense to produce these colored maps in the best cartographic style. The maps were possible because the Prince of Monaco paid the bills. He has thus given one more proof, amid his oceanographic researches, of his helpfulness in the development of maritime industries.

Albert I, Prince of Monaco, is widely known as an indefatigable student of the sea. His personality, however, has been best revealed in the book he published in 1905, "*La Carrière d'un Navigateur*" in which we see the man, as well as the scientist; for we get from it more than a mere inkling of the temperament and aspirations that have shaped his career. As the *Bulletin* said of the book, "it tells us of his views on many things, of his philosophic notions, and of his conviction that life is too serious to be spent in frivolity, a thought that was the basis of his determination to be a sailor and an oceanographer."

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Nothing more impressively illustrates our advancing knowledge of the various conditions of the oceans than the twelve colored maps (*Annal. d. Hydrog. u. Maritim. Met.*, Vol. 38, No. 1, 1910), showing what we now know of the temperature of the Pacific waters at the surface and at ten different depths, down to 4,000 meters. The scientific expeditions of the leading nations have, for many years, been collecting the observational material that is now so well expressed on many maps and charts. Not a few school wall maps are beginning to illustrate these facts so adequately that they are a great help to teachers in their class room talks on the oceans, their islands and their relation to the lands.

The various tints for depths show clearly that all the oceanic islands of the Pacific, for example, rise not from the deeps but are the culminating points of submarine ridges whose shape and extent are indicated on the maps, as far as our present knowledge goes; that the great complex of islands to the northeast and north of Australia stand on a submarine plateau which is connected with the continent and is believed to have once been a part of it; and, farther south, are observed the comparatively shallow waters, between Australia and South America, dotted here and there with islands, the submerged plateau on which they stand, suggesting a possible former land connection between the two continents. The width of the continental shelf along most coasts is now fairly well known and adds a new detail to maps of the oceans; and since the return of the Bruce expedition from Coats Land, the maps have



been able to show that the great submarine ridge, discovered when the first trans-ocean cables were laid, extends through the mid-Atlantic practically from Arctic to Antarctic waters. On the whole, the maps of the seas of the past twenty years, show improvement that is almost commensurate with that of the maps of land areas.

Mr. Herbert A. Dodge of Crystal Lake, Illinois, has presented the Society with a copy of Emil von Sydow's *Schul-Atlas* of 1866. This was eighteen years after the distinguished German geographer prepared the first issue of his small school atlas. It was an epoch-making book for the new ideas it embraced came, in time, to be recognized as the fundamental principles upon which school maps should be based; and from that time to the present, Sydow's *Schul-Atlas* and the Sydow-Wagner *Methodischer Schul-Atlas*, which succeeded it in 1889, thirteen years after Sydow's death, have stood in the forefront of school atlases. No other map product has more clearly and instructively illustrated the story of the steady progress of the cartographic art than the work which Sydow began, under the auspices of Justus Perthes, and which Dr. Hermann Wagner and the Perthes cartographers have so ably carried on.

Sydow introduced the revolutionary idea that school maps should tell children something more of geography than merely its political phases. Maps should picture as well the mountains, valleys and plains. Cartographic expression should be given to the land forms and the map should help the teacher to show what the surface of the earth is really like. Sydow's atlas introduced other innovations, but this was the fundamental idea and it has been steadily developed with the wonderful growth and improvement of map symbolism for the expression of a large variety of facts.

This interesting example of the eighteenth edition is not more than half as large as the atlas of to-day; but the contrast in size is no measure of the vast improvement in map expression, and in the content of geographical knowledge to be expressed, that are now seen in this and many other school atlases whose makers have followed in the path that Sydow blazed.

## GEOGRAPHICAL RECORD

### AMERICAN GEOGRAPHICAL SOCIETY

**ANNUAL MEETING OF THE SOCIETY.** The Annual Meeting of the Society was held at the Engineering Societies' Building, No. 29 West Thirty-ninth Street, on Tuesday, January 25th, 1910, at 8:30 P. M.

Vice-President Greenough in the chair.

The following persons, recommended by the Council, were elected Fellows:

Felix H. Hunicke,

Albert B. Lord,

Miss Ella Hunting,

Abram G. Nesbitt,

Adolph Rusch, Jr.

### REPORT OF THE COUNCIL

The Annual Report of the Council was presented and read by its Recording Secretary, Mr. Levi Holbrook:

NEW YORK, January 20, 1910.

To the American Geographical Society:

The Council respectfully submits the following report for the year 1909:

The number of Fellows on the 1st of January was 1,238. The additions during the year were 116. The losses by death, resignation, etc., were 100 and the total Fellowship on December 31st was 1,254, of which number 360 were Life Fellows.

There have been added to the Library 930 books, 3,780 periodicals and pamphlets, 1,112 maps and charts, and 13 atlases.

Seven meetings of the Society were held, at which addresses were made by

Mr. Herman Montagu Donner,

Professor William Morris Davis,

Miss Annie S. Peck,

Dr. Frederick Jones Bliss,

Mr. Arnold Henry Savage Landor,

Professor Charles Ernest Fay,

Commander Robert E. Peary.

The Cullum Geographical Medal has been awarded to Francisco P. Moreno for his work in the Andes and Patagonia; and to Ernest H. Shackleton for his explorations in the Antarctic.

The Charles P. Daly Medal has been awarded to William W. Rockhill for his travels and researches in China, Mongolia and Tibet; and to Charles Chaillé-Long for explorations and discoveries made by him in Africa.

There have been published in the *Bulletin*, besides the Geographical Record, the Scientific Notes, the Book Reviews and Bibliographical Lists, thirty-seven original papers. It is proposed to enlarge and improve the *Bulletin* during the coming year.

The Collection of maps and other appliances used by teachers of geography in European schools, which was made by this Society and exhibited in New York in 1908, has since been shown at the State Universities of Wisconsin, Minnesota, Ohio, and Michigan, the Universities of Chicago and Cincinnati, Denison University, Granville, O., and the State Normal College of Michigan, and has now been forwarded to the Pacific Coast. The demand for the exhibition from Universities, Colleges and Schools in the West, South and East, has been and continues gratifying, and letters from the various exhibitors testify to the educational value of the study of this material.

At the request of the Hudson-Fulton Celebration Commission the Society's collection of books, maps, etc., relating to Henry Hudson, Robert Fulton and their Times was exhibited, at No. 15 West 81st Street, during September and October and attracted many visitors.

The Society has received ten thousand dollars bequeathed to it, for its corporate purposes, by its late Fellow William R. Sands; and the sum has been invested in bonds, secured by mortgage of Real Estate in New York City.

The year 1909 has been a memorable one in the history of the Society. Its President, Mr. Archer M. Huntington, had for some time been impressed with the fact that the building No. 15 West 81st Street, although of recent and substantial construction and very beautiful, was fast becoming inadequate to the growing needs of the Society. On June 22nd, Mrs. Collis P. Huntington most generously conveyed to him, to be transferred to the American Geographical Society, free of all cost, a lot of land at the corner of Broadway and 156th Street, measuring 125 by 100 feet; and this land Mr. Archer M. Huntington has deeded to the Society for its permanent occupancy, stipulating only that there shall be erected thereon a building, the architecture of which shall harmonize with that of the Hispanic Society of America, which is in the immediate neighborhood. The Council accepted this magnificent gift with gratitude and enthusiasm; feeling that such an opportunity to secure for the Society a permanent, adequate and commodious home ought not to be neglected. The site may seem to some a little remote; but it is really very easily reached, and the city is constantly and rapidly growing in that direction. Already it is reached by subway, in 7 minutes from Columbia University, in 19 minutes from the new Public Library and the centre of the residential district at 42nd Street, and in 29½ minutes from Wall Street, the business centre of the town. Plans have been carefully prepared by Mr. Charles P. Huntington, Architect, for a building 125 feet on 156th Street and 65 feet on Broadway, which will be handsome, dignified, imposing and thoroughly well adapted to the purposes of the Society. When completed it will be an ornament to the City and a credit to the Society, its President and all concerned.

A special Building Fund has been established to which members of the Council and friends of the Society have already subscribed \$83,000; and it is hoped that their generous example will be followed by others and the new building thus become a gift to the Society—leaving all of its present property intact, and the income therefrom available for current expenses. Building operations are now in progress and it is proposed to continue them so long as there is money in the special Building Fund. Operations to cease when that special fund shall be exhausted; to be resumed when the Fund shall have been replenished; and so forth and so on. Fellows of the Society have so recently made generous contributions for building purposes that the Council is reluctant to appeal to them again at this time; but all friends of the Society are informed that monies are needed for the completion of the new building, and that contributions to the Building Fund will be thankfully received.

For the general financial condition of the Society reference is made to the report of the Treasurer which is herewith presented.

All of which is respectfully submitted.

CHANDLER ROBBINS,  
*Chairman.*

LEVI HOLBROOK,  
*Secretary.*

## REPORT OF THE TREASURER

The Report of the Treasurer, Mr. Henry Parish, Jr., for the year 1909, was read, in his absence, by Vice-President Greenough:

## GENERAL ACCOUNT

The Treasurer respectfully reports:

On January 1st, 1909, there was on hand a balance of..		\$4,602.20
During the year there have been received for Fellowship Dues, Sales of Publications, Interest on Invest- ments, &c. ....	\$23,323.78	
Legacy from the Estate of William R. Sands.....	\$10,000.00	\$33,323.78
Total.....		\$37,925.98

There have been expended for Salaries, Meetings, Library, Publications, House Expenses, Insurance, Postage, &c. ....	\$20,891.27	
Invested in guaranteed mortgages.....	\$14,650.00	\$35,541.27
Balance December 31st, 1909.....		\$2,384.71

The Reports of the Council and the Treasurer were approved and ordered on file.

The Report of the Special Committee, charged with the duty of selecting candidates for the offices to be filled, was presented and read:

NEW YORK, January 20th, 1910.

The Special Committee, appointed November 18, 1909, to nominate and recommend to the Society suitable persons to be elected in January, 1910, to fill vacancies then existing in its offices, reports that it recommends the election of the following-named persons to the offices designated:

President, ARCHER M. HUNTINGTON, term to expire in 1911	
Vice-President, J. HAMPDEN ROBB, " " 1913	
Treasurer, HENRY PARISH, JR., " " 1911	
Recording Secretary, HAMILTON F. KEAN, " 1913	
Councillors, ANDREW G. AGNEW, FRANK BAILEY, LEVI HOLBROOK, CHARLES A. PEABODY, PAUL TUCKERMAN,	} " 1913

Respectfully submitted,

JOHN GREENOUGH, ARCHIBALD D. RUSSELL, HAMILTON F. KEAN,	} Committee.
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The vote of the Society was unanimously in favor of the persons recommended by the Council, and they were declared duly elected.

Vice-President Greenough then introduced the speaker of the evening, Rear

Admiral Colby M. Chester, U. S. N., retired, who addressed the Society on "Regenerated Turkey." Stereopticon views were shown.

On motion, the Society adjourned.

PRESENTATION OF THE CULLUM GEOGRAPHICAL MEDAL TO DR. MORENO. The Cullum Geographical Medal, awarded to Dr. Francisco P. Moreno of the Argentine Republic, was formally presented to him, on Sept. 4, in behalf of the American Geographical Society, by the Hon. C. H. Sherill, Minister of the United States to Argentina. The presentation took place in the American Legation in Buenos Aires and was attended by thirty of the leading men of science of Argentina. In delivering the medal to Dr. Moreno, Minister Sherill paid high tribute to his achievements in the fields of geography and anthropology.

In reply to Mr. Sherill's remarks, Dr. Moreno expressed his profound gratitude for the honor conferred upon him by the American Geographical Society. He added that the occasion also evoked most grateful memories of the men who had assisted in the long labors for which he had received this signal distinction and of the famous secretaries of the Smithsonian Institution, whose advice and encouragement had always been most helpful.

Dr. Moreno has, for some months past, been active in the promotion of the International American Scientific Congress which will meet in Buenos Aires, this year, to celebrate the 100th anniversary of the Declaration of Independence of Argentina. He writes to the Society that he believes this Congress will help largely "to cement friendly relations between the United States and Argentina and be the means of further increasing mutual knowledge of their physical, economic, and social conditions."

#### NORTH AMERICA

EXPLORATION OF THE MOUNT MCKINLEY REGION. Professor Herschel C. Parker, J. H. Cuntz, and Belmore H. Browne, all Fellows of this Society, expect to spend the approaching summer in the Mount McKinley region of Alaska. While they intend to climb Mount McKinley, if practicable, their principal work will be the scientific exploration of this little known region. They will accordingly be fully equipped with instruments to record the topography and hypsometry of the mountains and glaciers. They intend to spend from one to two and a half months on the ice and snow above the line of vegetation and to make photographic studies of the conditions they find there. For this purpose the party is being equipped with a complete outfit suited to high altitudes and arctic conditions. The party will ascend the Sushitna River, explore the difficult southern approach to Mount McKinley and it is likely that an effort to ascend these mountains will be made on its southern side. As the expedition will go north for scientific work in one of the most difficult mountain regions of Alaska and will be under the leadership of Prof. Parker, whose large mountaineering experience is well known, its purposes have been approved by our Council and the work will be done under the auspices of the Society.

SURVEY OF MOUNT BAKER QUADRANGLE. The topographic survey of the Mount Baker quadrangle, in the State of Washington, was completed last fall. The survey party was under the direction of J. E. Blackburn. In the course of the work Mr. Blackburn, with E. H. Jones, T. L. Duncan, and C. V. Guerin,

climbed Mount Baker, from whose slopes and summit observations were made and mapping was done.

Mr. Blackburn says that the whole mountain is an almost unbroken glacier, only narrow rocky dikes protruding here and there through the vast ice mass. This glacial ice, constantly augmented by snowfall, accumulates in a number of huge gorges, forming glaciers that move down the mountain sides for several miles before melting. Thus the ends or lower boundaries of the glaciers are about 3,700 feet above sea level, whereas the altitude of the dome of Mount Baker is 10,745 feet. The climb to this summit was made in four hours by the topographic party from its last camp, which was pitched at an elevation of 5,200 feet.

Mount Baker was long ago one of the active volcanoes of the Cascade Range, and the steam issuing from the vents of its crater to-day show that its internal fires are not yet entirely dead. The crater is about 1,000 feet below the main dome of the mountain, and this last lap of the climb proved by far the hardest. Mr. Blackburn describes the summit as a table having an area of about 60 acres.

PROGRESS OF THE U. S. GEOLOGICAL SURVEY. The Thirtieth Annual Report of the Director of the U. S. Geological Survey for the fiscal year 1909 has just been issued. It announces that large areas that had been withdrawn from entry pending determination of their mineral or non-mineral character, were restored to agricultural entry after examination, and selling prices were placed on 1,500,000 acres of coal land. On information furnished by the Survey, lands available for water-power sites on 26 rivers in the Western States were withdrawn from entry.

Nearly 24,000 square miles were topographically surveyed. About 36 per cent. of the country has now been mapped in detail. Work on maps for an atlas of national forests was continued. Thirty folios covering as many national forests were finished and 19 others were nearly completed.

Work on the map of the United States, on a scale of 1:1,000,000, was begun during the year. This will form a part of the world map that is now in preparation under international agreement between several countries. Topographic and geologic surveys were made in Alaska of areas exceeding 4,000 and 5,000 square miles, respectively. Two of the copper-bearing belts of southeastern Alaska were mapped in detail and the copper and gold-bearing belt extending from the head of Copper River to White River was covered by a reconnaissance survey. Gold deposits, coal beds, and water resources of parts of Alaska were also studied, and statistics were collected to show the mineral production of the Territory.

Geologic work was done in all parts of the country, the investigations including the iron ores of New Jersey, Virginia, Alabama, Georgia, and Tennessee; the lead and zinc deposits and industry of the Mississippi Valley; the coal beds of Indiana, Illinois, Colorado, Utah, Montana, and Wyoming; the oil fields of Louisiana, Texas, Arkansas, Oklahoma, Colorado, Nevada and California; the peat deposits of Maine; the phosphates of Idaho and Wyoming; deposits of mica, manganese, copper, tin, tungsten, and tantalum in Western States; mineral paint ores in Pennsylvania; granites in New England, and building stones in Arizona.

Mining districts in Colorado, Utah, Arizona, Nevada, and Oregon were investigated. Co-operation with many States in geologic work was continued, and



progress was made on the geologic atlas of the United States. The work on water resources comprised stream gauging at 829 stations. Examinations of underground water resources were made and co-operation with many States in these investigations was continued.

During the year 134 books and pamphlets and 289 maps were published. The Survey's maps now comprise nearly 1,800 sheets of the standard size, covering that many separate areas in different parts of the country. Nearly a million publications were sent out, of which about 450,000 were sold.

**MISSOURI GEOLOGICAL REPORTS.** "The Geology of Morgan County" by Professor C. F. Marbut, is the third of the series of detailed county geological reports issued by the Missouri Bureau of Geology and Mines which are to cover all the counties of the state. In addition to the geological detail the author has presented a clear exposition of the economic resources of the county. A map in colors shows the distribution of rock formations in addition to cultural detail.

"The Geology of Pike County" is by Mr. R. R. Rowley, who had long studied the paleontology of Pike County. He has established the horizons in which certain groups of fossils occur, the geological sections for the county and he accompanies the report with a geological map.

Probably the most important report yet issued by the Missouri Bureau of Geology and Mines is "Geology of the Disseminated Lead Deposits of François and Washington Counties" by Dr. Ernest R. Buckley, to which Vol. IX (Parts 1, and 2) is given. The report adds to our knowledge of one of the most important deposits of lead ore in the United States. Attention is especially directed to the geological history of the area in its relation to the ore deposits. The large amount of illustrative matter includes photographic views, maps in colors, and many profiles, sections, etc. Part 2 is given entirely to 117 plates.

**FLORIDA STATE GEOLOGICAL SURVEY.** The second annual *Report* of this Survey has been published under the supervision of E. H. Sellards, State Geologist. It includes a report on the mineral industries and a report on the geology of Florida, with special reference to stratigraphy, to which is added a chapter on the topography and geology of southern Florida. The report of stratigraphy was prepared in co-operation with the U. S. Geol. Sur., in accordance with the agreement of 1907. The *Report* is illustrated with half tones and accompanied by a geological map of the state in colors (See New Maps, p. 152).

**BANQUET OF THE GEOGRAPHICAL SOCIETY OF CHICAGO.** The annual banquet of the Geographic Society of Chicago was held at the La Salle Hotel on Jan. 26, 1910. Six hundred persons participated. The guests of honor were Prof. T. C. Chamberlin of the University of Chicago and Commander Robert E. Peary, U. S. N., to each of whom the Society presented its Helen Culver gold medal. Miss Culver was herself at the speakers' table.

The President of the Society, Mr. Jesse L. Smith, made the opening address. President Harry Pratt Judson of the University of Chicago was the toastmaster. Prof. U. S. Grant of Northwestern University made the speech, presenting the medal to Prof. Chamberlin. The inscription on the medal read:

"Presented, April 26, 1910, to Professor Thomas C. Chamberlin for distinguished contributions to the principles of dynamic geography and for the planetesimal hypothesis from which they spring."



Prof. Chamberlin expressed his pleasure in the honor conferred by his co-workers in the science of geography.

The address of presentation for Commander Peary was made by Prof. R. D. Salisbury of the University of Chicago. The inscription on this medal read:

"Presented, April 26, 1910, to Commander R. E. Peary, U. S. N., for distinguished services in arctic exploration, and for the first achievement of the North Pole, April 6, 1909."

In Commander Peary's response he gave a brief résumé of his many years of continued effort, with its failures and final success. He expressed his keen gratitude for the recognition and approval of the Society.

#### SOUTH AMERICA

THE CHILEAN CENSUS OF 1907. The figures for this census, which was taken on Nov. 28, 1907, have just been published by the Government under the title "Sinopsis Estadística Geográfica de Chile en 1907" (Santiago, 1909). The 23 provinces and the Magellan Territory have an area of 758,206 square kilometers, a population of 3,254,451, giving a density of 4.2 to the square kilometer. The most populous provinces are Santiago, 517,648; Valparaíso, 281,872; Concepción, 217,393; Coquimbo, 175,149; Nuble, 166,340; Colchagua, 159,119; Cautín, 140,159; Aconcagua, 128,644; Valdivia, 118,842. Foreigners number 134,524, of whom 72,378 are Europeans (including 18,755 Spaniards, 13,023 Italians, 10,724 Germans, 9,845 English and 9,800 French); and 58,118 Americans (including 27,140 from Peru, 21,968 from Bolivia, 6,956 from Argentina and 1,055 from the United States). The Chinese number 1,920 and the Araucanian Indians, 101,118. The cities with more than 20,000 inhabitants are Santiago (332,724), Valparaíso (162,447), Concepción (55,330), Iquique (40,171), Talca (38,040), Chillán 34,269), Antofagasta (32,496), Viña del Mar (26,262).

#### AFRICA

ANOTHER LINK IN THE CAPE TO CAIRO R.R. A despatch from Khartum (*London Times*, Weekly Edition, Dec. 31, 1909), said that on Jan. 1, 1910, another section of the railroad on the Cape to Cairo route would be opened to traffic. The road had been extended from Khartum, along the west bank of the Blue Nile, to the south-east and had reached Wad Medani, on that river, 120 miles from Khartum. Wad Medani is an important town on the Blue Nile, the headquarters of the Governor of the Blue Nile province and of one of the Sudanese regiments. According to the plan adopted some years ago, the Cape to Cairo railroad is to extend eastward towards the Abyssinian frontier in order to avoid the wide, marshy region along the White Nile.

#### ASIA

COMPLETION OF THE PEKING-KALGAN R.R. This railroad, the first to be built by Chinese engineers and with Chinese money, was opened on Oct. 2, 1909. This is the first section of the line that is to extend west from Kalgan, along the edge of the high plateau of Mongolia to Kwei-hwa-tshöng and thence to Hokau on the great northern bend of the Hoang river. This extension from Kalgan will be about 250 miles long and is to be completed in seven years. China proposes,

later to extend a railroad from Kalgan across Mongolia to Kiachta, on the southern border of Siberia, also to be built by Chinese engineers. This line will follow an old caravan route through the wastes of northern Mongolia. The Russians propose to build a line from their Trans-Siberian line, south of Lake Baikal, to Kiachta and, when these two projects are carried out, there will be a new and much shorter rail route between the European markets and the Far East than that provided by the Siberian-Manchurian lines through Harbin.

Kalgan, the present terminus of the line from Peking to the west, is a large city and the most important trading point, northwest of Peking, along the edge of the Mongolian plain. Even in Marco Polo's day the region it occupies was known, far and wide, for its vineyards and orchards. The new line passes through a very fruitful and populous country, inhabited chiefly by Mohammedans. It is expected that the railroad across Mongolia will greatly stimulate Chinese immigration into that region. (*Geog. Zeitsch.*, Vol. 15, p. 705.)

Meanwhile, according to *Globus* (Vol. 96, p. 370), the Chinese government will establish an automobile line through the Gobi Waste between Kalgan and Urga with the special purpose of using freight motors instead of camel caravans in the tea trade.

DR. F. J. BLISS'S LECTURE BEFORE THE SOCIETY. In his lecture "A Palestine Pilgrimage," before the Society, on Nov. 23, Dr. F. J. Bliss, for ten years Field-Officer of the Palestine Exploration Fund of London, touched only incidentally on his own specialty of archaeological discovery, though he explained the results and some of the methods of recent excavations. Thus, before reaching Jerusalem, the audience saw, with the aid of the lantern, the massive monoliths, constituting the Pre-Israelite High-Place recently excavated at the site of Gezer by Mr. R. A. S. Macalister, a former colleague of Dr. Bliss. These pillars were doubtless standing when Gezer became part of the dowry of Pharaoh's daughter, at the time of her marriage to Solomon. At Jerusalem, he gave a view of the shaft dug by Sir Charles Warren, over 40 years ago, which revealed the colossal foundation stones of the Jewish Temple, 80 feet below the present surface. The excavations conducted by Dr. Bliss and Mr. A. C. Dickie of London, in 1894-1897, were also illustrated by plans and views, showing the recovery of the remains of ancient city-ramparts, with gates and towers, some of which are probably identical with those besieged by Titus. The original lines of the once arcaded Pool of Siloam were also recovered, with a magnificent flight of steps leading to it, and a church subsequently built over it—a church which was first described by a pilgrim of the sixth century, and which disappears from history about the time Columbus discovered America.

Later a side-excursion was made to the Low-Country between the Judean Hills and The Philistine Plain, for the purpose of seeing the sites where the lecturer excavated several ancient towns. Prominent among these was the mound of Lachish—one of the first places taken by Joshua—whose 60 feet of accumulated debris were proven, by careful and minute excavations during four seasons, to conceal the remains of eight superimposed towns, covering a period of some 1,200 years, beginning in early Pre-Israelite times and terminating with the Greek era. Ground plans of some of the towns were shown, together with views of pottery and other finds. Only the barest outlines of the work could be indicated, while the recent excavations of the Austrians at Jericho, with the present

work now being carried on by the Harvard Expedition at Samaria, were merely mentioned. The main theme of the lecture followed the well-known paths of Palestine travel.

#### AUSTRALASIA AND OCEANIA

PROF. DR. NEUHAUSS IN KAISER WILHELM LAND. A letter from this explorer written at Sissanu, in Kaiser Wilhelm Land near the Dutch New Guinea border, on Sept. 10, 1909, is published in the *Zeitschrift* of the Berlin Geographical Society (No. 10, 1909, pp. 689-90). He set out, with missionary Keysser, in January, last year, from the Sattel-Berge near Finsch Haven, for a journey of 40 miles into the interior through a wholly unexplored region. He found it a wild mountain land, very difficult to traverse, as the faint, native paths lead continually up and down the almost precipitous slopes of the mountains, many of the ascents and descents being over 3,000 feet. The villages of the blacks were found as high as 4,580 feet above the sea and the region was far more populous than had been supposed. He crossed the large Bulesom river which empties into Huon Gulf, over 30 miles north of its mouth. He made route surveys, many observations for heights and collected cartographic data which have enabled him to make a map of nearly the whole of Kai Land as the southeastern peninsula of Kaiser Wilhelm Land is called.

Later, he found distinct traces of former glaciation along the coast of Huon Gulf to the south of the Markham river mouth. In May and June he made two journeys up the Markham river and established the fact that it is navigable by the flat bottom boats of the natives for at least 60 miles. On account of the hostility of natives living around Lake Womba, the river had not hitherto been ascended by Europeans more than 18 miles. It does not lose itself in swamps, as had been supposed, but maintains a breadth of over 300 feet with a depth, in part, of 10 to 13 feet and its wide valley (up to 19 miles) between high mountain chains, is well populated.

The explorer says that, at Sissanu, an earthquake, in December, 1907, caused important surface changes. A coastal strip some miles in length sank several meters so that many palm trees, now dead, are half submerged.

NEW ZEALAND GEOLOGICAL SURVEY. This Survey has published *Bull. 7* (New Series), on "The Geology of the Queenstown Subdivision, Western Otago Division," by Prof. James Park, who was engaged for five months in the study of this mining region, among the finest of the New Zealand Alps in South Island. The report contains 112 pp. of text, with many superior illustrations and maps. It includes an investigation of the configuration and physical features of the land, with special attention to evidences of former glaciation; and studies of the rock formations and geological structure, the nature and extent of gold-bearing alluvial drifts and lodes at Macetown, Skipper's and Arrow and the water supply.

#### POLAR

CAPT. BERNIER IN THE AMERICAN ARCTIC. Captain J. C. Bernier sailed from Quebec on the Canadian polar steamer, the *Arctic* (formerly the *Gauss*), on July 28, 1908. He had as scientific assistants, Prof. J. MacMillan, geologist, and W. E. Jackson, meteorologist, the latter being expected to take magnetic

observations at the winter quarters. Dr. Joseph Bolduc was the physician of the party. A quick journey was first made to Etah, near Smith Sound, to leave some supplies for Dr. Cook. Capt. Bernier then passed through Lancaster Sound, made a short stop in Erebus Bay, on the south coast of North Devon, Barrow Strait, and then, through Melville Sound, he reached Melville Island where he passed the winter of 1908-9 at the spot where Parry had wintered in 1820.

Last spring a sledge party was sent westward to Banks Land whose eastern shores were reached on April 26, after 20 days of travel. The coal outcrops on the north coast of Banks Land, discovered by Dr. Hamilton in 1856, were also visited and also the cairn erected by McClure in 1853 on Dealy Island. This depôt was found to be despoiled of everything excepting a little coal and some pieces of canvas. The records left by Parry were found and brought back and also a pole used by Sir John Franklin. Capt. Bernier says that if his instructions had not limited him, he might easily have made the northwest passage once more.

He took formal possession of the whole archipelago from 60° to 140° W. and up to the North Pole (?), including the islands discovered by the Norwegian Sverdrup. He found on Melville Island many musk-ox, reindeer, wolves and foxes, besides some polar bears and seals along the coast.

On Aug. 12, 1909, after 11 months in the archipelago, the expedition sailed from Melville Island and reached Quebec on Oct. 5. According to the report of a luncheon given to Capt. Bernier (*Ottawa Citizen*, Oct. 18), Sir Wilfrid Laurier, who was present, expressed the hope that Capt. Bernier would be ready to start again in 1910 with the same ship and crew, and promised that a free hand would be given to him to go to whatever latitude he found possible.

**THE NORTHEAST PASSAGE.** The Russian government has long believed that it may be found to be practicable to use the Northeast Passage as a sea route, especially for war vessels. This probability is believed to have been already demonstrated in the western part of the Asian Arctic Ocean. In November last the ice breakers Taimyr and Waigatch sailed from St. Petersburg for Vladivostok with the intention, next summer, of entering the Arctic Ocean through Bering Strait and studying this question along the northeastern coast of Asia.

**DR. V. PIETSCHMANN IN WEST GREENLAND.** This well-known Vienna zoologist has returned from West Greenland where his attention was especially given to the collection of the lower forms of life in the ocean waters. He has brought home 9 boxes of prepared specimens for the k. k. Naturhistorisches Hofmuseum.

**THE SWISS-GERMAN GREENLAND EXPEDITION.** The scientific members of this expedition (1909) were Dr. A. Stolberg of Strassburg and Dr. E. Baebler and Dr. A. de Quervain of Zürich. They made investigations of the upper air with the aid of 60 pilot balloons; took salinity measurements during the ocean voyage and in Godthaab Harbor; secured specimens of the sea bottom in this fiord; made measurements of evaporation and of carbonic acid in the atmosphere, the first researches of the kind in that latitude; studied some low forms of life in relation to similar work in the Alps; and travelled over the inland ice for about 60 miles from its edge, mapping its surface forms with the aid of a theodolite and discovering, about 50 miles from the edge, a great system of crevasses. (*Pet. Mitt.*, Vol. 55, No. 12, p. 374, 1909.)

DOES NOVAYA ZEMLYA CONSIST OF THREE ISLANDS? The expedition sent to Novaya Zemlya by Gov. Sosnowsky returned to Archangel at the end of September bringing the surprising information that in Cross Bay they had discovered a waterway which extended clear across to the Kara Sea; thus they were able to prove that Novaya Zemlya consists of three instead of two islands.

SURVEYING THE NORTH COAST OF SIBERIA. The *Bulletin* reported (Vol. 41, p. 384) the sending of an expedition by the Imperial Russian Academy of Sciences for the survey of the northern coast of Siberia from the Lena delta to Bering Strait. It is now learned (*Pet. Mitt.*, Vol. 55, p. 372) that the western section of the party, under the geologist, U. A. Volossovitch, has completed the survey between the Lena and Kolyma rivers. It is not surprising that many new indentations have been discovered since the only survey along this coast was made by Dim. Laptef on shipboard, in 1739-42, excepting the stretch between the Indigirka and the Kolyma which was examined in 1823. New proofs were found of the shallow depths of the Arctic Ocean along this coast.

THE NORWEGIAN EXPEDITION TO SPITZBERGEN. Captain Isachsen's expedition to Spitzbergen returned to Christiania on Sept. 18, 1909, after a very successful season of field work. The 15 men in the party, including two geologists and two topographers, sailed from Norway about the middle of June. The topographers were busy till the middle of August on the west coast of the main island between Ice Fiord and King Bay and also on the coast and in the interior of Prince Charles Foreland. Their work in the latter part of August was on the north side of the main island between Dane Island and Wood Bay. The geologists were at work in July in Prince Charles Foreland, on the coast to the east of Foreland Sound and on the peninsula between English and King Bays. In August, the rates of movement and recession of Lilliehøek Glacier were ascertained and the crystalline schists and eruptive rocks of the interior were studied; also the Devonian formation between Red and Liefde Bays and on Reindeer Peninsula. Early in September, the entire party were at work on both sides of Foreland Sound and in Green Harbor. The vessel, meanwhile, made soundings in King Bay and in the northern part of Foreland Sound. The weather was not very favorable for topographic work, as fog and rain prevailed. The summer season was late. Foreland Sound was not free of ice till the middle of July, a month later than usual. Ice was fast to the north coast throughout the summer. (*Globus*, Vol. 96, p. 370.)

SHACKLETON WILL NOT RETURN TO THE ANTARCTIC. Sir Ernest Shackleton denies the rumor that he will head another expedition to the Antarctic in the immediate future. He says, however, that should he decide to go south again he would travel towards the pole from Weddell Sea or Kaiser Wilhelm II Land.

THE SIZE AND MEAN HEIGHT OF ANTARCTICA. Professor W. Meinardus has a paper in the November and December numbers of *Petermanns Mitteilungen* in which he discusses the distribution of atmospheric pressure and the consequent exchange of air between the northern and southern hemispheres and attempts to deduce from these data an approximate idea of the mean height of the southern continent. The tentative conclusions he reaches are that, having regard to the proportion of the Antarctic area known to be covered by sea, the land surface may be taken as 14,000,000 square kilometers and its mean height at 2,000 meters with a probable error, one way or the other, of 200 meters.

Commenting upon Dr. Meinardus's deductions, *Nature* says that the values he gives for the size and mean height of Antarctica may not be very far from the truth. Recent explorations, at least, suggest that these values are worth keeping in view. If the estimate as to size is approximately correct, Antarctica is one and a half times as large as Europe. It is also the highest of the continents, the mean height of Asia (950 meters) being less than half that of Antarctica as calculated by Prof. Meinardus. The enormously thick covering of inland ice is, of course, an important factor.

#### PHYSICAL GEOGRAPHY

AN ATLANTIC DEEP SEA EXPEDITION. The London *Times* (Weekly Edition, Nov. 12, 1909), says that the Norwegian government has donated the use of its steamer *Michael Sars*, for a scientific expedition in the Atlantic from the Canary Islands to the Faröes. The vessel will be engaged in this work for four months. Sir John Murray, Dr. Johan Hjort of the Department of Fisheries, Norway; and Dr. Helland-Hansen, the Norwegian oceanographer, will take part in the expedition. The purpose is to try in the ocean the new methods and instruments that have come into use in the past few years. It is believed, for example, that very large fishing nets and trawls may now be used successfully at great depths—even down to three and a half miles. The *Michael Sars* has recently brought up from a depth of over a half mile, 225 fish, 100 of them belonging to new species. If these largest catching appliances can be used with success in the greatest depths of the Atlantic, important zoological results may be obtained. Special attention will be given to the distribution in depth of the pelagic algæ and their relation to the depth to which sunlight penetrates in different latitudes. Much interest will be attached to observations with Ekman's new current meter, which will be used to measure the rate of currents over oceanic shoals. The *Michael Sars* will leave Plymouth about April 6. A series of sections will be made from the coasts of Europe over the Continental Slope into deep water as far south as Gibraltar or beyond. It may be possible to make records, by this instrument, in very deep water, where our present knowledge of currents is almost nothing. Attempts will be made to force long tubes into the sea floor at oceanic depths with a view of procuring sections and ascertaining if there be layers differing in composition.

THE MESSINA EARTHQUAKE. The Italian earthquake of Dec. 28, 1908, was of such interest to the people of earthquake-shaken Japan that they sent their great seismologist, Dr. F. Omori, at once to study the phenomena. He arrived in the district about the middle of February, remaining till the end of April. He studied the seismological phenomena while his colleague, Prof. F. Nakamura, studied architectural questions. At the end of a year his preliminary reports was written, published in English, and delivered in America. ("Preliminary Report on the Messina-Reggio Earthquake of Dec. 28, 1908," by F. Omori, *Bulletin of the Imperial Earthquake Investigation Committee*, Vol. III, No. 2, November, 1909, pp. 37-45.)

Dr. Omori shows that the Tokyo seismograph records indicated that a great shock (three times larger than the 1905 earthquake in Calabria) had originated in or near Calabria with large casualty, the time of origin being closely known.

In the field he found that the earthquake motion was sensible within an area of radius of 200 kilometers, buildings being damaged or destroyed throughout



an elliptical area thirty kilometers by twenty, containing the cities of Messina and Reggio, with a population of 190,000 people.

Almost all the houses in Messina were cracked or absolutely demolished. The city streets, usually less than 11 meters wide and with four to six-story buildings, were completely blocked with stones and mud, whose average depth was 5 meters. Consequently, a small proportion of those who escaped out of doors saved themselves. A little over 100,000 souls perished. The seismic intensity in Messina was a little less than that of Nagoya, Japan, during the great Mino-Owari earthquake of 1891, yet the loss of life compares in such ratio that Dr. Omori regards 998 out of every thousand persons in Messina who died as having been the victims of the bad construction of houses.

It is shown that the earthquake was not volcanic, but "caused by the sudden formation or extension of a crack within the earth's crust in a E. S. E. and W. N. W. direction, whose plane was nearly vertical or inclined slightly towards N. N. E."

The *tsunami* or *maremoto*, often erroneously called tidal waves, was observed for 38 kilometers on the Calabrian coast and 100 kilometers on the coast of Sicily, doing much damage to houses, bridges, breakwaters, etc., and rising to heights of from .8 to 10.6 meters. The tsunami moved northward through the Straits of Messina and seems to have been due chiefly to the settling of the loose surficial deposits through a height of 1 or 2 meters.

One of the maps shows clearly the relations of the area of violent motion to the similar areas for the twelve other great destructive shocks of Calabria since 1638, illustrating very clearly "the principle that great earthquakes in a given region occur, not everywhere at random, but along a definite line of weakness in the earth's crust, namely, a seismic zone. Further, the areas of violent motion of the different earthquakes are almost perfectly exclusive of each other, whence it may be concluded that the great disturbances are not repeated from one and the same center, but happen successively from different points or portions along the seismic zone. In other words, the places seismically most dangerous in Central and Southern Italy are exactly those points along the seismic zone here defined which have not yet been visited by a very violent shock. The two cities of Messina and Reggio-Calabria, which formerly had not been shaken by a great telluric convulsion originating from a center close by, had evidently their turn on the present occasion, and for that very reason may be supposed as being free from the danger of a future seismic catastrophe. Even in the case of a great earthquake occurring along the seismic zone, the intensity of motion at these two cities would, on account of the distance from the center, not be so very strong, and precaution taken in the construction of houses would be sufficient to prevent the loss of life and property."

L. M.

#### OBITUARY

DARIUS OGDEN MILLS. Mr. Mills died on his estate near San Francisco on January 3, 1910. He was born at North Salem, N. Y., in 1825. His distinguished career as a financier and publicist has, for many years, made his name well known to his fellow-countrymen. Mr. Mills became a Fellow of the American Geographical Society in 1880, a member of the Council in 1882 and Vice-President of the Society in 1901, which position he held until his death.



At a meeting of the Council on Jan. 20, 1910, the following minute was read by President Huntington and adopted by the Council:

"The members of the Society and of the Council mourn the loss of a man truly gifted with greatness of spirit whose life in all his relations with his fellowmen bore witness to the influence and power of integrity. He, many years, maintained the character of truth which his greatness and his simplicity entitled him to wear as a garment before men.

"We all grieve for the loss of one who touched profoundly our sense of the nobility of perfect honesty, sincerity, manhood and dignity."

WILLIAM HENRY HELME MOORE. Mr. Moore died at his residence in New York City, on January 4, 1910, in his 86th year. For 47 years he had been identified with the American Geographical Society and was one of its most esteemed and prominent members. Following is an extract from a minute read by Vice-President Anton A. Raven, at the meeting of the Council on Jan. 20, 1910, and adopted by the Council:

"Mr. Moore entered Union College and was graduated from that institution in 1844. Later, he received the degree of LL.D. from his Alma Mater. His connection with this Society began as a Fellow in 1863. In 1870, he was elected Domestic Corresponding Secretary and he became Vice-President in 1897. Advancing years made it necessary for him to retire from the Council in 1906 but his interest in the Society was undiminished.

"Mr. Moore was a man of high ideals, courteous and sympathetic in his demeanor and had the respect and esteem of all with whom he was brought in contact. It is a pleasurable duty to bear testimony to his worth. We mourn his loss and tender to his family our warm sympathy in their bereavement."

## GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

### BOOK REVIEWS AND NOTICES

**The Story of the Great Lakes.** By Edward Channing and Marion Florence Lansing. ix and 398 pp., Maps and Illustrations. The Macmillan Company, New York, 1909. \$1.50.

This account is divided into three parts, each covering a stage in the development of the country about the Great Lakes. Part I contains the story of the discovery and exploration of the lakes. It is a story that fascinates the reader because of the wonderful men who penetrated into these Indian strongholds. There is the story of Champlain's trip to the Huron villages and his unsuccessful attempt to aid this Indian tribe in warfare against its Iroquois enemy. There arises in one a reverence for Father Jean Brebeuf, founder of the Jesuit Mission among the Hurons; and the account of the careful and well-conducted life the priests led among the savages and of their martyrdom when finally the Huron nation was destroyed by the Iroquois reads like a romance. Then follow in quick succession, the story of the pageant of Saint Lussou, agent of Louis XIV at Sault Ste. Marie, with regalia and ceremony intended to impress the savage guests, the history of the voyage of La Salle in his wonderful ship, the *Griffon*, and a description of the weak and unfortunate attempt of La Barre to frighten the chief of the Iroquois.

Part II is the story of the occupation and the contest for the possession of the Lake country. The account opens with the voyage of Cadillac and the founding of Detroit and this is followed by the history of the battle of Niagara and the gaining of Canada by the English. The attempt of Pontiac to conquer Detroit by conspiracy and his subsequent defeat and Wayne's campaign against the Indians are rehearsed, and the narrative continues through the war of 1812 to the completion of the Black Hawk war, when the foundations of the Lake states were laid.

Part III is entitled "Occupation and Development." The transformation of the old Iroquois trail from Albany to Lake Erie through the various stages of pathway, turnpike to railroad and canal lines is told in an attractive way. The impressions and adventures of early travellers are portrayed to make the story vivid. A chapter on "Lincoln and Douglas in Chicago" is introduced here to show, seemingly, how just prior to the Civil War, a lake state, Illinois, had become a "political storm centre to which the eyes of the whole people were turned," but the account breaks the continuity of the story and diverts the interest from the theme. On the industrial side, a description of three great industries, the fur trade, lumbering and copper mining, and the story of the shipping on the Lakes are given, but the space allotted to these is so limited that only the merest skeleton of facts is possible and the chapters merely suggest the extent of the development that has been made. The book is illustrated with a few pictures,

mostly from old prints, and contains a bibliography. It may be highly recommended as a background for the study of this region. The salient points of the story of the Lakes are emphasized, but "no minute and exhaustive chronicle has been attempted."

ROBERT MARSHALL BROWN.

**England and the English from an American Point of View-**

By Price Collier. 434 pp. Charles Scribner's Sons, New York, 1909. \$1.50.

Mr. Collier has a style which pleases; it is what one may call very readable, though his writing at times has a vivacity which sets the reader questioning whether the plain facts of the case are not over seasoned with mere style. He has, as it appears, lived with the English, has seen and studied them when they have been on guard and off guard. He has the fashion of writing with a convincing air, and if you yourself have seen the English in their island home and have received impressions which you could not well classify and arrange, you will be helped by Mr. Collier's lucid analysis.

His "First Impressions" are, indeed, strikingly presented; but, perhaps, like most writers who undertake the portrayal of the manners and customs—all that, indeed, goes to make up the life of a people other than the writer's own—he sees much that goes to make up what we call national traits with eyes and judgment too serious. He is not one of them, and is often looking "at them rather than with them."

As a "Land of Compromises," Mr. Collier finds here much to criticise in state, church and social life; but he admits that "it is difficult with such people to discover what are their ideals, what are their real likes and dislikes."

Though writing a chapter on the topic "Are the English dull," he answers this, as a question, with an emphatic negative, and he takes occasion to praise what he calls their "steadiness," which many are inclined to interpret as dullness. The author is one who has been trained to see far more than the average person can or does see of the environment in which he may be placed. He is alert both to see, to hear, and to form judgments. There is an excellent chapter on "Sport," as there is an illuminating one on "An English Country Town."

E. L. STEVENSON.

**The Lombard Communes. A History of the Republics of Northern Italy.**

By W. F. Butler. 495 pp., Illustrations, Maps, and Index. Imported by Charles Scribner's Sons, 1906. \$3.75.

It is not an easy task to find one's way through the period of Italian history here under consideration. There were great general movements in those centuries which one can well and truly call peninsular or Italian, but there was so much of local coloring, so much that was strikingly individual in the social and political life of the many city-states, especially of central and northern Italy, that very clear and logical thinking and planning is essential for the one who successfully tells the story of the period. Professor Butler has done his work remarkably well. He has read his Muratori, Lanzani, Ferrari and others with care, though not always agreeing with the conclusions of the last two named. To the theory by these advanced,—a theory very generally accepted,—that the internal feuds of the Italian cities of the period were the results of an antagonism between the civic nobility, who had imbibed Roman ideas, and the country nobility, forced to come and live within the walls of the cities, Professor Butler

takes exception, and for the reason, as he asserts, that it would be practically impossible to find an instance in which the party faction clearly represents the original civic aristocracy and the other the conquered country nobles.

After telling us what Lombardy is, and briefly describing its geographical features, with special reference to the location of the several cities which dot this great northern plain, he then explains those movements by which the Bishops began to acquire temporal authority, a clear understanding of which is so essential in tracing the rise of republican institutions in Lombardy. In the opinion of the reviewer the beginnings of the free republics of this region are nowhere more clearly and concisely set forth than in the first four or five chapters of this work.

The Lombard League, in its struggles with the Emperor Frederick, claims at least six chapters, or near one-half of the book. Through a consideration of the party strifes of Guelph and Ghibeline which follow the wars of the League, we have it clearly set forth, without too much detail, how the despots at length appeared upon the scene as real liberators, who temporarily, at least, rescued the land from the destructive violence of party strife. We have, indeed, in this work a scholarly and readable account of the later mediæval centuries of northern Italian history, through which we pass directly into the important period of the Renaissance.

The illustrations of the work are excellent, directing attention in the main to the architecture of the period. The well-drawn maps are intended to represent territorial boundaries, within the region under consideration, at intervals of about thirty years from the beginning of the thirteenth century to the middle of the fourteenth.

E. L. STEVENSON.

**Le Morvan.** Étude de Géographie humaine. Par le capitaine J. Levainville, Docteur de l'Université de Bordeaux. 305 pp., 44 figures et cartes, 40 phototypics et 4 dessins hors texte. Armand Colin, Paris, 1909. Fr. 10.

The features which make a geographical unit of the Morvan "country" are mainly negative; it is the country deprived of all that makes the neighboring countries attractive. While it has never formed a political or ecclesiastical province—a circumstance which it has in common with several of the most important "countries" of France,—its location and extent are determined by a consensus of popular opinion which, all over the adjoining countries of Nivernais and Burgundy, designates the hilly solitudes which separate the latter as the "bad country" in opposition to their own prosperity and possibilities. War has never penetrated into these hills, where no booty of any value would reward the victor; nor, on the other hand, has the progress of modern thought and civilisation. Its only connection with the fate of the larger country was made through the soldiers which it furnished to the armies of the King, and the wood that was shipped from the forests to heat the people's homes. Geologically, Morvan is one of the "old" countries of France; it belongs to the belt of crystalline rocks which traverses France from Brittany to the Vosges, and its boundaries correspond on the West, North, and East, to the line of contact—often enhanced by faults—between these "primary" rocks (*e. g.*, Archæan to Permian) and the sedimentary rocks of "secondary" origin; toward the South the line of demarcation is less distinct. A border zone of liassic remnants adjoins the Morvan proper on the North and East; the lower northern half (Bas Morvan) is an old dissected peneplain in process of rejuvenation, while the southern and

highest part (Haut Morvan) was formed contemporaneously—and, perhaps, in connection—with the chains of the Alps.

These natural differences are reflected in the economic aspects and conditions of the respective regions. The liassic limestones of the border zone make comparatively good soil, which is productive of meadows and fields; the settlements, obliged to cluster around the wells and springs, form large villages, and the limestone used in the construction of the houses gives the landscape an aspect of gaiety which is not found elsewhere in the country. Buttes and mesas of hard limestone introduce a picturesque element into the scenery and betray, at the same time, the existence of a former peneplain worn down almost to base level. In the Bas Morvan, too, the present topography is the work of erosion. Its rocks are mainly gneisses and granites, and the width of the valleys and the heights of the hills are in proportion to the greater or lesser resistance of the rock material. Seen as a whole, the surface is gently undulating; in the gneiss districts the valleys are broader and the humps more numerous; the valleys are well drained and the waste of the hills has made comparatively good soil in the bottoms (*ouches* in the vernacular). The granite rocks make steeper slopes often strewn with large boulders. The water often stagnates in the bottoms; hence ponds are frequently found there and the fields are poor; the slopes make pastures, and woods of crippled oaks cover the hilltops. The population, finding water all over the country, is under no compulsion to crowd around any special place for its sake; on the contrary, the poor soil necessitates larger farms, and the utilisation of every square foot of tolerable quality. Hence the settlements are scattered all over the country, and the distances between the cheerless, low, grey, thatched houses increase as the quality of the soil decreases.

The Haut Morvan is composed mainly of eruptive rocks of carboniferous origin, and of Devonian schists and quartzites. Under the combined action of Tertiary uplift and of erosion its topography has become quite diversified. Its principal characteristics are the numerous valleys or basins of an almost square shape which owe their origin and form to the two diametrically opposite directions of the Alpine uplift. Their bottoms are occupied by the settlements, while the hills are covered with pastures, heaths, and woods.

The climate of Morvan is rougher than it ought to be by virtue of its geographical location, because the chilling effects of altitude are reinforced by the excess of moisture on the impervious soils. Woods and forests predominate, therefore, and in many "cantons" they are to-day as untouched as they were in Roman times. There are 75 acres of woodland per inhabitant in this country, against 25 acres per inhabitant for the whole of France. In the past the export of wood for fuel, especially to Paris, used to be its chief means of sustenance; but since the introduction of coal and kerosene for fuel, this modest industry has experienced a heavy drawback which is especially hard for the small landowners who can, or will, not combine to control the prices. Necessity has obliged the people to try their soils for agricultural purposes, and by means of fertilisation and a scientific rotation of the crops, as good results have been obtained as may ever be expected of a "bad" country.

More satisfactory have been the experiments at utilizing the land for pastures. Horses, cattle, and pigs have proved good sources of income to their breeders. The lack of good roads is, however, even now a great obstacle to real progress, for, owing to the bad connection with outside centers, most of the trading is still done at local markets where oversupply keeps the prices down.

A new, and very profitable, industry has been introduced since 1842, namely, that of nursing. Almost every wet-nurse in Paris is a native of Morvan. This business has reacted, however, as a check on the natural increase of the otherwise very prolific, population, through the increase of infant mortality among the nurses' own children. On the other hand, it is about to establish an interesting exchange of city and country population. According to the custom of French urbanites to have their children brought up at the nurses' homes in the country, many of these women take their wards to their native villages, and having once grown up there, quite a number of the latter remain and settle in the country. This influx seems so important that fears have already been expressed lest the native race, hitherto exceptionally pure in its isolation, be altered, in a future not very distant, through the assimilation of so much foreign blood. As far as numbers go, this increase is more than compensated for by the number of those nurses who become acclimated in the city and cause their families to follow them. Besides these permanent migrations, there are temporary exodi of the Morvanders as season laborers in the adjoining countries, whose dates for the performance of the various stages of farm work are considerably in advance of the mountains. Thus, the Morvander often goes through a regular cycle of labor, rising and descending as the season requires: in Jan. and Feb. he is a woodcutter at 600 m. above sea level; from the end of Feb. to the beginning of April, he floats or rafts wood at 350 m.; from the latter part of April to the middle of June, he labors in the fields at or below 200 m.; then he rises again to 450 m. to take care of his own fields until the beginning of July; from then to the middle of August is harvest time at 200 m.; from then to the middle of Sept. the same in Morvan; from then to the middle of October, vintage in Burgundy; from then on to the end of the year, fall sowing and general work about the farm on his own ground. The money earned abroad, by the laborer as well as the nurse, is invested in improving their homes and their standards of life both of which are sorely in need of it, owing to the combined power of poverty and ignorance.

As another of the series of French monographs published by Armand Colin, the book is worthy of its predecessors, both with regard to what it teaches the reader about its subject, and the pains taken by the publishers in making type, pictures, and maps, as excellent as possible. MARTHA KRUG GENTHE.

**Mythen und Erzählungen der Küstenbewohner der Gazelle Halbinsel (Neu-Pommern) im Urtext aufgezeichnet und ins deutsche übertragen von P. Jos. Meier, M.S.C.** xii and 291 pp. Druck und Verlag der Aschendorffschen Buchhandlung. (Anthropos-Bibliothek, Band I, Heft 1.) Münster i. Wien, 1909.

To those whose geography of the western Pacific has been practical, the memory needs no long flight to recall a period when New Britain was almost wholly unknown. Twenty-five years ago, the adventurous voyager who pushed up St. George's Channel beyond the Duke of York group was sailing quite into the uncharted seas, unknown lands and wild races of men. Such fragments of information as were available were to be found only by diligent search of the geographical journals, and even in the case of so earnest an explorer as Wilfred Powell, were found to apply but poorly to the terrain itself.

Now New Britain is coming into knowledge. Germany has annexed the islands in that sea, and has given to the archipelago and to all its islands new and German names. Hence in the title of Father Meier's book we find Neu-



Pommern. Within a year we have reviewed Stephan and Graebner's work on the opposite coast of New Ireland, one of the best geographical monographs, and the highly important work of Parkinson, "Dreissig Jahre in der Südsee," most of which deals with the Gazelle Peninsula; and now comes Father Meier with an inner record of the people.

Of the inhabitants of the peninsula we already begin to have a certain degree of accurate information. In their ethnic bearing, they are to be classed among the Melanesians. We know at least that the people of the Gazelle Peninsula are widely removed from the Papuans of New Guinea and that their affinities are traceable for a considerable distance down the range of the Solomon Islands and perhaps even further into the northern New Hebrides. Equally with their southern congeners they have been affected by the sweep of Polynesian migration past their coast, and in the quality of the loan material absorbed into their cruder speech, we find them above many of the southern Melanesians.

Father Meier has collected the inner life of the people in this collection of their tales. He finds them gay, not disposed to find much to dread in life. He explains the origin of the first men, a pair of men and one a fool, as a moon myth representing the full and the dark of the moon. He gives their record of the creation of the first pair. Who created them? They were scratched in outline on the ground, the figures were sprinkled with blood and covered with leaves. Then they became men and themselves created women out of cocoanuts. But who scratched the figures, whose blood was shed to give them life? Why, He. What could be a simpler statement of first cause? Absolutely naught more is known by these people than in these opening words of their saga of the making of man: "He scratched two male figures on the soil, he scraped his skin and as the blood trickled down he sprinkled it on the two figures."

In other stories we have an interesting history of the two men of this first creation, To Kabinana and To Karvuvu. The latter is the fool, and he it is who brings to mortals their mortality.

There is a large collection of beliefs of the life among the shades, very interesting in the fearlessness with which the natural man passes out of life. We find also a mythology of the beasts and birds, stories bubbling over with good humor and rich enjoyment of natural life. Unmoral as all these stories are we note with no surprise that they are all clean; the tellers of these tales are still too low in the scale of thought to have reached the point where indecency becomes a topic for literary expression.

Adding this work to the scanty collection of material upon this region, it is to be hoped that Father Meier will present still more contributions from the store of his intimate acquaintance with the people to whom he has devoted his life.

WILLIAM CHURCHILL.

**Report on the Scientific Results of the Voyage of S. Y. "Scotia" during 1902, 1903 and 1904.** Under the Leadership of William S. Bruce. Vol. II. Physics. Part 1. Meteorology, by R. C. Mossman; Part 2.—Magnetism, by Charles Chree and R. C. Mossman; Part 3.—Tides by Sir George H. Darwin. v and 324 pp., Maps, Diagrams, and Illustrations. 1907. 1 Guinea.

Vol. IV. Zoology. Part 1.—Zoological Log, by David W. Wilton, J. H. Harvey Prie, and R. N. Rudmose Brown. xiv and 103 pp., 2 Maps, 33



Plates, including 100 Photographs, Colored Frontispiece, and Index. 1908. 10s. 6d.

Vol. V. Zoology. Parts 1-13.—Invertebrates, by Prof. J. A. Thomson, J. Ritchie, Sir Charles Eliot, James Murray, and others. viii and 313 pp., and 36 Plates. 1909. 23s. 6d. The Scottish Oceanographical Laboratory, Edinburgh.

The scientific results of the *Scotia* Antarctic Expedition, 1902-4, commanded by Dr. William S. Bruce, were of the highest value, and the scientific workers who are especially interested in one or another of these reports are glad to see that they are being produced in a series of fine volumes worthy of their importance.

The first of them to appear in book form is the first three Parts of Vol. 2 containing the meteorological, magnetic and tidal results of the expedition. Most of the volume is devoted to the meteorological results, and, as the expedition was particularly strong in meteorology, with Mr. Robert C. Mossman in charge of the department, this feature of the work has special value. The tables, meteorological log and discussion of the results occupy 306 pp., and the report gives full details of the various phases treated. Mr. Mossman contributes a number of pages of notes on the magnetic observations which are discussed by Dr. Charles Chree, who has testified to the excellence of Mr. Mossman's work in this department, though the expedition had not been fitted out to carry on magnetic researches. The tidal results are discussed by Prof. G. H. Darwin, who speaks of them as very valuable as relating to a very great expanse of sea uninterrupted by land.

Vol. IV, Part 1, gives the Zoological Log of the expedition and it illustrates the value of the practice, upon which Dr. Bruce insisted, on this expedition, of making immediate records of everything of scientific value. The log is a field notebook of the natural history of the voyage, a faithful record of the life observed, and helps to fill in the picture of the Antarctic regions.

Zoology is treated in Vol. 5, which is devoted to the Invertebrates. The various collections were placed in the hands of specialists and the scientists of France, England, Germany and Ireland collaborated with those of Scotland in the production of this handsome volume. Most of the papers relate to new species and other matters that have comparatively little geographical interest. Dr. Koehler of Lyons, in his paper on the Echinoderms (except the Holothurians) emphasizes the great value of the results of the *Scotia* expedition from the point of view of deep-sea work. "The naturalists of the *Scotia* were the first to do deep-sea dredging in high southern latitudes and the results show how much there is still to be done in the working out of the fauna of these seas."

The volumes, which are edited by Dr. Bruce, have many illustrations and a number of maps. A fine series of plates in Vol. IV is given to the many phases of animal life that were observed in the Antarctic.

**A Junior Course of Comparative Geography.** New Edition. By P. H. l'Estrange. viii and 384 pp., 142 pp. of Maps, and 146 Pictures and Diagrams. George Philip & Son, Ltd., London, No date. 3s. 6d.

The new edition appears in much enlarged form, but the general plan and the order of chapters are unchanged.

It is a volume for children in the upper grammar grades, as we would say,

dealing with the principles of physical geography and with the general geography of the several continents. The elements of physical geography are first organized and text, illustrations and maps are then applied, first to the interpretation of the British Isles, then to Europe, North America and Asia, to Central and South America and Africa, and finally to the British Empire. By this plan continents which have many similarities are treated together, so that comparisons are readily possible, and the home country is studied first and last, thereby giving the pupils a better understanding of their own empire than they have of any other part of the world.

The black and white physical, political and economic maps are the most prominent feature of the book and give a basis for the excellent map questions and exercises with which the volume is liberally provided. The method of procedure is excellent and good results ought to be secured by any well-equipped teacher who uses the plan intelligently. The text is in some cases meagre and does not fully supplement the map questions. For American teachers the book is suggestive for its plan and its exercises, many of which could be readily adapted to the study of the more attractive and clear maps in our school texts.

R. E. DODGE.

**Madeira: Old and New.** By W. H. Koebel. xi and 216 pp., many Illustrations from Photographs by Miss M. Cossart, and Maps. Francis Griffiths, London, 1909. 10s. 6d.

An interesting though somewhat discursive account of a fascinating country. The earlier portion of the volume deals with the history of Madeira, which helps us to understand some of the persistent habits and customs of the people as well as their mental point of view. The later and larger portion of the volume deals with the present conditions in Madeira, with especial emphasis of the scenery, methods of transportation, religious fiestas, the industries and the development of Madeira as a tourist resort. One chapter is devoted particularly to hints for tourists.

The history of the alternation of wine and sugar as the leading agricultural crops of the country, is considered in some detail with the reasons therefor. Three times in the last century, the vine has been cultivated, and the climate and soil seem to make it the natural crop of the region. The description of the irrigation and water supply system as now seen in the ever-present "levadas" is very interesting, as showing how early some of the modern systems of water carriage were developed in spite of engineering difficulties and the lack of engineering skill.

The chapter on the climate gives the impression that Madeira is a winter paradise more attractive than the Riviera. The average annual range of temperature is only 6°, but in the winter months the higher portions of the islands are very frequently cloud-covered and depressing. The warm, dust-bringing, easterly wind, known as the "leste," is a striking feature, and its disastrous effects on the vegetation and on animal life are very great. In spite of these periodic invasions of dust, Madeira is in general dustless and clear.

The book reads well, the illustrations are numerous and good, but poorly placed in the text. The volume as a whole is a popular tale, told from a good knowledge of facts of geography, history and present life. The story is well told, but would have been more effectively presented if a more adequate map had been included.

R. E. DODGE.

**Au pays de l'or noir. Para, Amazonas, Matto Grosso.** Par Paul Walle. 244 pp., 60 Views from Photographs and 3 Maps. E. Guilmoto, Paris. No date. Frs. 4.50.

An interesting and complete account of the rubber industry in the valley of the Amazon, including the areas of production, the types of rubber forming trees, the methods of gathering and treating the gum and the statistics of rubber trade in the region.

The earlier part of the volume includes a description of the geography of Pará, a glowing account of the climate of the Amazon region, grazing in the Amazon country and an account of a voyage up the Amazon, including descriptions of the cities and towns which may be seen from the steamer. The remaining seven chapters are devoted entirely to the rubber industry.

One is struck by the author's emphasis of the healthfulness of the Amazonian climate, which seems to be borne out by the comparative statistics of mortality. These show that the death rate here is 28.75 per thousand, which is less than half that at Bombay and slightly less than that at St. Petersburg.

Grazing in the natural grassy areas and in fenced farms is developing rapidly and herds of cattle, zebus and horses are numerous and increasing. In some cases modern systems of breeding are being introduced and the milk-producing ability of the cattle is being rapidly increased. The industry seems to thrive in spite of the alligators and jaguars, and the cattle diseases which at times produce enormous destruction.

In the chapters on rubber production, the character and value of the different rubber-producing trees are considered in detail and the palm given to the "King of all rubber trees," the *Hevea brasiliensis*. Brazil to-day produces more than 65 per cent. of the rubber of the world, and vast areas of rubber culture are as yet unexploited. Particularly interesting is the account of the development of Acre which, only a few years ago, was in the public eye because of the attempts to make this region an independent country. Brazil secured this country by treaty and by paying an indemnity of £2,000,000 sterling. Already this region has been of great value to Brazil and has more than paid for itself from the profits of its rubber.

The author devotes one chapter to a comparison of the value of Amazonian rubber with Asiatic rubber and shows that the former is generally considered by the rubber brokers as more elastic and strong. This is largely due, it is supposed, to differences in the method of rough curing of the rubber, and the author believes that the difference in production in Brazil's favor is to increase as the years go on.

The volume is well written and well illustrated and gives an excellent account of the rubber industry in the Amazon country up to the end of the year 1908. It forms an excellent source of information and is a distinct, authoritative addition to our rational volumes on commercial geography. R. E. DODGE.

**The Geology and Scenery of the Grampians and the Valley of Strathmore.** By Peter Macnair. Two Vols. Vol. I, xiv and 195 pp.; Vol. II, xii and 199 pp.; Bibliography, Index and many Photographs, Diagrams and Maps. James MacLehose & Sons, Glasgow, 1908.

The geological history of the Grampian Hills of Scotland and the Midland Valley or "Lowlands" south of them, as set forth in this two-volume work, may

be summarized as follows: A series of Pre-Cambrian (?) rocks, mostly marine sediments, was raised above the sea and folded into several great "fans" whose axes trended northeast and southwest. Marine erosion reduced this mountain system to a submarine plain, upon which red marine sediments, the Old Red Sandstone system, were deposited. The whole was then apparently raised above the sea. One of the great denuded fan-folds, with the sandstones lying upon its bevelled surface, was dropped down between two fault planes, and now underlies the broad Midland Valley. In the district of the Grampians, north of the valley, southeast flowing streams developed on the southeast sloping surface of the Old Red Sandstones, and finally cut into the underlying Pre-Cambrian (?) rocks, whereupon northeast-southwest tributary streams were developed along soft rock belts trending with the strike of the fan folds. Ultimately sub-aerial erosion removed the sandstones from most of the highland area, exposing the old surface of marine denudation, now much dissected by the transverse and longitudinal streams. Glaciation deepened some of the stream valleys to form lake basins, and filled others with glacial deposits. Slight changes in the position of the land with respect to sea level, and the normal work of post-glacial river erosion have given the finishing touches to the landscape.

The reader will unfortunately find much in the work which merits unfavorable criticism. The evidence presented in the text does not convince one that the author's interpretation of structure is correct. The verity of the marine planation of the ancient rocks rests on the assertion that the conglomerates at the base of the Old Red Sandstone series point unmistakably to the existence of a sea margin creeping slowly inward upon the gradually sinking land. The possibility of a relatively recent date and sub-aerial origin for the base-levelled plain is not considered by the author; and the highly improbable interpretation of it as a resurrected marine plain of ancient date is not supported by any evidence. The marine origin of the Old Red Sandstone series is defended, in spite of its included remains of land plants and fresh-water fishes; and the arguments by which the author supports the marine theory take no account of the literature on continental deposition which has appeared in the last decade.

The work is full of obscurities and contradictions. The volcanic rocks occurring in the Old Red Sandstone are described on page 5 of Volume II as having been poured out on the sea-floor and interbedded with the sandstones; on page 159 of the same volume we read that after the sandstones had been deposited, uplifted, and later dropped down between two faults, the sunken area became the site of igneous action which poured the lavas out on the surface and intruded sills and bosses into the strata. It would appear that the same volcanic rocks are referred to in each case. The diagram on page 160, Volume II, to illustrate one stage in the geological history of the region, shows a base-levelled surface which is not mentioned in any place in the two volumes.

The physiography and scenery receive less attention than the structure and stratigraphy, and the treatment of the former two topics is perhaps even less satisfactory than that of the latter. Much space is devoted to lists of altitudes of numerous peaks, to the location of things better shown on maps, and even to the enumeration of the tributaries entering the two sides of rivers. Important matters, such as the present appearance of the dissected base-level plain, the development of the drainage features, and the glaciation of the highland valleys, receive treatment which is quite inadequate, and in many places even crude.

The descriptions of the base-level surface are not supported by the illustrations, which suggest an upland of marked relief. Lake basins are accepted as the measure of glacial erosion, notwithstanding that the error of this measure has often been pointed out. The importance of ice action in modifying the forms of the valleys and in producing much of the ruggedness of mountain form, is not recognized. It is asserted that the Highland valleys were formerly filled up with boulder clay, which was later removed by local glaciers and post-glacial denudation; yet no evidence is given to support the assertion of so improbable a history.

The work is abundantly illustrated by numerous beautifully colored maps and excellent engravings. Occasionally the confusion which characterizes much of the text is apparent in the maps. On the geological map at the end of Volume I, the axis of the great central fan or "Fächer" is located near the northern boundary fault of the Midland Valley, and labelled "Supposed axis of Marginal Fächer." The axis of the "Ben Lawers Fächer" is labelled "Axis of Great Central Fächer." As a result, the descriptions on pages 181-183, with their reference to the map, are most confusing.

The work is altogether a most disappointing publication. The reader finishes his perusal of the text with the conviction that it does not treat in a capable and convincing manner the important subject with which it deals.

D. W. JOHNSON.

**The California Earthquake of April 18, 1906.** Report of the State Earthquake Investigation Commission. In Two Parts and Atlas. By Andrew C. Lawson and Others. Part I: xviii and 254 pp.; Part II: pp. 255-451, Maps, Seismograms, and Illustrations. Carnegie Institution of Washington, Washington, 1908. Price (2 Parts and Atlas) \$17.

The Atlas is noticed in the *Bulletin*, Vol. 41, p. 469. The Report has been everywhere recognized not only as an able and complete account of the California earthquake of 1906, but also as a very important addition to the literature of seismology. Although the Commission which made this investigation and report was appointed by the Governor of California, the State government provided no funds for the conduct of the work. The resulting embarrassment was finally relieved by a subvention from the Carnegie Institution.

**Wissenschaftliche Ergebnisse der Expedition Filchner nach China und Tibet, 1903-1905.** X. Band—I. Tiel. 1 Abschnitt: Zoologische Sammlungen. C. Attems, M. Burr, A. Forel and Others; 2 Abschnitt. Botanische Sammlungen. Prof. Dr. Diels. xii and 288 pp., Map, Illustrations, and Index. Ernst Siegfried Mittler und Sohn, Berlin, 1908.

The expedition of Lieut. Wilhelm Filchner to China and Tibet was remarkably fruitful in scientific results and was recognized by the German Geographical Congress with a special vote of thanks. Means were provided for the full presentation and discussion of these results and the volumes are now appearing, in sumptuous form, from the press of Mittler & Son. Eighteen specialists of Germany, Austria, Switzerland and England report, in the present volume, on the zoological collections. The botanical results, chiefly the work of the explorer's wife, are discussed by Dr. Diels in 28 pp.

**La Figure de la Terre.** Les grandes opérations géodésiques. L'ancienne et la nouvelle mesure de l'arc méridien de Quito. Capitaine G. Perrier. (Revue de Géographie annuelle. Tome 11.-1908.) vi and 307 pp., Maps, Illustrations, and Tables. Librairie Ch. Delagrave, Paris, 1909.

Captain Perrier of the Service géographique de l'Armée of France, gives to geographers in this volume a comprehensive account of the measurement of arcs of the meridian in Peru, Ecuador, Sweden, Spitzbergen, the United States, Canada, South Africa and other parts of the world, and the results of these labors. The work covers the development of geodesy in the past three centuries and shows the necessity for these great geodetic operations in order to establish the bases for exact topographic mapping. The author describes in detail the methods of measuring an arc of the meridian and the modern instruments employed. The bibliography with 97 titles will be found very useful.

**Die Schwerebestimmung an der Erdoberfläche.** Prof. Dr. Joh. Bapt. Messerschmitt. viii and 158 pp., 25 Illustrations and Index. Friedrich Vieweg & Sohn, Braunschweig, 1908. Price, M. 5.

One of the best works yet written on Gravitation and Gravity Determinations. The author, who is in charge at the Magnetic Observatory at Munich, describes the principles upon which the determination of gravity depend, the methods and apparatus used in observations and the importance of the study in investigations relating to the figure of the earth. The book is No. 27 of the natural science and mathematical monographs published under the general title of "Die Wissenschaft" by Vieweg & Son.

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### GENERAL

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## NEW MAPS

### NORTH AMERICA

#### UNITED STATES GEOLOGICAL SURVEY MAPS

UNITED STATES. Map Showing the Distribution of Iron Ores in the United States. 1 inch=110 miles. Prepared by E. C. Harder. Illustrates "The Production of Iron Ores, Pig Iron and Steel in 1908," in "Mineral Resources of the U. S., 1908," U. S. Geol. Surv., Washington, 1909. [Colors to distinguish hematite brown ore, magnetite and iron carbonate. List of districts, variety of ore and active mines are given on margin with numbers corresponding to those on the maps.]

UNITED STATES. Map of the United States Showing Locations of Blast Furnaces in 1908. 1 inch=110 miles. Compiled by W. T. Thom. Based on Swank's Iron and Steel Works Directory for 1908. Illustrates "The Production of Iron Ores, Pig Iron and Steel in 1908" from "Advance Chapter from Mineral Resources of the U. S., 1908." U. S. Geol. Surv., Washington, 1909. [Locations of blast furnaces are shown in red, numbered for lists of districts, locations and number of stacks printed on margin.]

UNITED STATES. The following Black and white maps illustrate *Bull* 381-A, "Investigations of Coal Fields in Indiana, North Dakota and Montana by the U. S. Geol. Surv. in 1908:" (a) Map of Washburn Lignite Field, N. D. 1 inch=4 miles. By Carl D. Smith. [Shows lignite mines and exposures with list of mines and composite section.] (b) Map of Fort Berthold Indian Reservation Lignite Field, N. D. 1 inch=4 miles. By Carl D. Smith. [Shows lignite outcrops and exposures.] (c) Map of Fort Peck Indian Reservation Lignite Field, Mont. 1 inch=4½ miles. By C. D. Smith, J. A. Davis, E. R. Hopkins and E. L. DeGolyer; (d) Map of southeastern part of Bull Mountain Coal Field, Mont. 1 inch=1 mile. By R. W. Richards. [Shows probable thickness of various beds, with columnar section.] (e) Map of northwestern part of Bull Mountain Coal Field, Mont. 1 inch=1 mile. By R. W. Richards. Detail as on map d; (f) Map of Milk River Coal Field, Mont. 1 inch=3 miles. [Shows rock formations, coal zones, mines and prospects with 23 columnar sections.] (g) Map of Northern Part of Custer National Forest, Mont. 1 inch=4 miles. By Carroll H. Wegemann. [Shows coal outcrops, mines, prospects and stratigraphic sections.]

FLORIDA. Geologic and Topographic Map of Florida. 1:1,000,000=15.78 miles to an inch. Prepared by the U. S. Geol. Surv. in Co-operation with the Florida Geol. Surv. Geology and Topography by G. C. Matson, F. G. Clapp and Samuel Sanford under the direction of T. Wayland Vaughan. With 2nd Annual Report, 1908-9, of the Florida State Geol. Surv. (in pocket), Tallahassee, 1909. [14 colored symbols for geological formations and a section across the peninsula in the latitude of Daytona and Ocala.]

#### U. S. HYDROGRAPHIC OFFICE CHARTS

Pilot Chart of the North Atlantic Ocean, Jan. and Feb., 1910.

Pilot Chart of the North Pacific Ocean, Feb., 1910.

#### U. S. WEATHER BUREAU CHARTS

Meteorological Chart of the North Atlantic Ocean, March, 1910.

Meteorological Chart of the South Atlantic Ocean, March, April, May, 1910.

Meteorological Chart of the North Pacific Ocean, March, 1910.

Meteorological Chart of the South Pacific Ocean, March, April, May, 1910.

#### DEPARTMENT OF AGRICULTURE MAPS

UNITED STATES. Soil Survey Maps of the Modesto-Turlock Area, Cal.; Bienville, East Carroll and West Carroll Parishes, La.; Montgomery Co., N. Y.; Richland Co., N. D.; Parkersburg Area, W. Va. 1:63,360 and 1:62,500. [Each map accompanied by descriptive text.]

NEW YORK. Economical Geology of New York and Part of the Adjoining States. No scale. By Amos Eaton. With paper "One Hundred Years of New York State Geologic Maps 1809-1909," by Henry Leighton. Museum Bull. 133, New York State Museum, Albany, 1909. [A reproduction of the first geologic map of New York State as a unit. It appeared in Eaton's "Text-book" in 1830.]

NEW YORK. Geologic Map of the Port Leyden Quadrangle. 1:62,500=1.9 mile to an inch. Illustrates Bull. 135, New York State Museum, Albany, January, 1910. [14 symbols for geological formations, distribution of stone quarries and three structure section lines across the quadrangle referring to figures on page 38, giving a general idea of the rock formations and their relationships to one another.]

CALIFORNIA. (a). Map of a Portion of the Shasta Co. Copper Belt East of the Sacramento River...showing the principal Mining Properties. (b). Copper Belt of Northern Siskiyou Co.; (c) Green Mountain Group of Mining Claims, Mariposa Co.; (d) Map of the Ubehebe Mining District, Inyo Co.; (e) Map of Mining District in immediate Vicinity of Greenwater, Inyo Co. California State Mining Bureau, Lewis E. Aubury, State Minerologist, San Francisco, 1908. [Black sketch maps showing the copper mines in the areas mapped. Illustrates Bull. 50, "The Copper Resources of California."]

CALIFORNIA. Map of California Showing the Approximate Location of the principal Copper Deposits of the State. 1 inch=21 miles. With Bulletin No. 50, "The Copper Resources of California," California State Mining Bureau, Lewis E. Aubury, State Minerologist, 1908. [The copper locations are shown by red dots.]



CANADA. Carte de la Colonisation dans le Nord-Ouest canadien. 1:7,500,000=118.35 miles to an inch. With "Les Ressources naturelles du Nord et du Nord-Ouest canadien" in *Ann. de Géog.*, Vol. 18, Nov. 15, Armand Colin, Paris, 1909. [The detail of botanical limits, cultural features, etc., are finely reproduced on a smaller scale from maps in "Canada's Fertile Northland," the "Atlas of Canada," and the "Railway Map of the Dominion of Canada," published by the Dominion Government.]

CANADA. Topographical Map of Part of the Main Range of the Rocky Mountains adjacent to the Canadian Pacific Railway. 1:80,000=1.2 mile to an inch. From photographic surveys by Arthur O. Wheeler, assisted by M. P. Bridgland and H. G. Wheeler. Contour interval, 250 feet. Department of the Interior, Topographical Surveys Branch, Ottawa, 1903-7. [Illustrates "The Rockies of Canada," by Walter D. Wilcox. Black and white.]

## CENTRAL AND SOUTH AMERICA

PERU. Croquis que Indica los Linderos Agrícolas y la Geologia de los Valles de Chicama y Santa Catalina. 1 inch=2 miles. With descriptive text. *Bol. del Cuerpo de Ingenieros de Minas del Perú*, No. 71, Lima, 1909. [Agricultural areas in green.]

PERU. Croquis del Valle de Jequetepeque ó Pacasmayo que Destaca el Area de Pampa y el de Valle Cultivados. 1 inch=2 miles. With descriptive text. *Bol. del Cuerpo de Ingenieros de Minas del Perú*, No. 71, Lima, 1909. [Agricultural areas in light, and valley of the Rio Jequetepeque in dark green.]

## AFRICA

CENTRAL AND SOUTH AFRICA. 1:5,000,000=79 miles to an inch. 6° N.-36° S. Lat.; 8°-43° E. Long. By J. G. Bartholomew. Insets of East London, Port Elizabeth, Cape Town, Durban, Lourenço Marques and the Mouths of the Zambezi river. The Edinburgh Geographical Institute, Edinburgh, 1910. Paper, 2s, cloth, 3s. [A new edition of this excellent map giving railroad extensions and other new information. One of the most satisfactory maps of these parts of Africa.]

EAST AFRICA. Die Ostafrikanische Bruchstufe von 1° 40' bis 4° südl. Breite. 1:150,000=2.38 miles to an inch. 2 Sheets. Bearbeitet von Carl Uhlig mit Unterstützung von Max Moisel. 35° 30'-36° 38' E. Long. In *Mitt. aus den Deutsch. Schutzgeb.*, Ergänzungsheft 2, Teil 1: Die Karte, Berlin, 1909. [This fine map gives the geographical results of the survey by Dr. Uhlig of a part of "The Great Rift Valley" of East Africa. His expedition spent 6½ months in 1904 in the survey and four chapters of this supplement are given to a discussion of the construction and contents of the map. It is in 3 colors: yellow for contours (interval about 100 feet), blue for hydrography and black for nomenclature. It was produced at the cartographic establishment of D. Reimer (E. Vohsen), Berlin. The map and the accompanying letterpress are particularly fine examples of geographical work. Dr. Uhlig has used on the map, not only his own results, but also those of other observers in the same field.]

SAHARA. Croquis du haut Guir. 1:1,000,000=15.78 miles to an inch. No map net. With "Le Haut Guir," By Général Bernard in *Bull. Soc. de Géog. d'Alger et de l'Afrique du Nord*, Vol. 14, No. 2, Algiers, 1909. [Sketch map

of the hitherto unknown region to the west of Colomb Béchar, drawn during the campaign of a French military force in 1908.]

SPANISH GUINEA. Itinéraires de la Mission Cottes à travers la Guinée Espagnole. 1:1,600,000=25.2 miles to an inch. With paper "La Guinée espagnole" in *Ann. de Géog.*, Vol. 18, Nov. 15, Armand Colin, Paris, 1909. [A black sketch map.]

UGANDA. Schema Geologico del Gruppo Centrale del Ruwenzori. 1:40,000=0.6 mile to an inch. By A. Roccati. Il Ruwenzori (Parte scientifica, Vol. 2). Ulrico Hoepli Milan, 1909. [Shows the geological results of the Duke of the Abruzzi's expedition, June-July, 1906, in the central group of Ruwenzori. Nine colors to show geological formations.]

UGANDA. Carta Geognostica della Zona dell'Uganda. 2,100,000=33.1 miles to an inch. Il Ruwenzori (Parte scientifica, Vol. 2). Ulrico Hoepli, Milan, 1909. [6 colors show the geological formations along the route of the Duke of Abruzzi's expedition from Entebbe, the British capital of Uganda, to the summit of the Ruwenzori range.]

## ASIA

CELEBES. Schetskaart van Tapalang. 1:100,000=1.5 mile to an inch. Illustrates paper "Medeelingen, Betreffende Eenige Mandharsche Landschappen." *Bijdragen tot de Taal-, Land-en Volkenkunde van Nederlandsch-Indië*, Vol. 7, Part 8, 1909. [A black and white map showing topography, footpaths, etc.]

FORMOSA. No scale. With "De Rietsuiker-industrie in de verschillende landen van productie. In *De Indische Mercur*, Vol 33, No. 1 Amsterdam, 1910. [Black sketch map showing boundaries of perfectures, railroads, area in sugar and the mountain lands of the east.]

INDIA. Volksdichte im Nordwestlichen Indien. 1:3,000,000=47.34 miles to an inch. By H. Heins. With paper of same title and author in *Pet. Mitt.* Vol. 55, No. 7, Justus Perthes, Gotha, 1909. [Based on the Indian Census of 1901.]

TIBET. Dr. Erich Zugmayers Reiseweg in Nordwest-Tibet, Juni bis Sept., 1906. 1:1,000,000=15.78 miles to an inch. From his own surveys. With "Bericht über eine Reise in Westtibet," by Dr. Zugmayer. *Pet. Mitt.* Vol. 55, No. 7, Justus Perthes, Gotha, 1909.

## AUSTRALASIA AND POLYNESIA

PONAPE. Karte der Insel Ponape. 1:100,000=1.5 mile to an inch. Von M. Moisel. In *Mitt. aus den Deutsch. Schutzgeb.*, Vol. 22, No. 3. Dietrich Reimer (Ernst Vohsen), Berlin, 1909. [The map is based upon the German Admiralty Chart No. 116 and the surveys of Vice-Gov. Berg, 1902-6. It shows the government reservation, political partitions, land forms in brown and has large nomenclature and many heights in meters.]

## EUROPE

AUSTRIA-HUNGARY. Eiszeitkarte der Liptauer Alpen. 1:100,000=1.5 mile to an inch. By Dr. Roman Lucerna. No map net. Illustrates "Glazialgeologische Untersuchung der Liptauer Alpen" in *Sitzungsbericht der k. Akad. der Wissenschaften*, Vol. 117, No. 7, Part 1, Vienna, 1908. [Shows in colors the results of Dr. Lucerna's study of forms of glaciation among these mountains.]

AUSTRIA-HUNGARY. Karte der politischen Bezirke Melk und Scheibbs. 1:200,000=3.1 miles to an inch. 47° 40'-48° 20' N.; 14° 50'-15° 45' E. Freytag & Berndt, Vienna, 1909. [Light and shade and contours of elevation are used to give a clear picture of the relief forms. The same idea is employed on the large school map of Switzerland, published by the Federal Government. Contour interval, 50 meters. The sheet is a reduction of the large school wall map of this region issued by the same publishers.]

AUSTRIA-HUNGARY. (a) Karte der Österreichischen Alpenländer. 1:1,500,000=23.67 miles to an inch; (b) Karte des Erzherzogtums Österreich unter der Enns. 1:600,000=9.4 miles to an inch; (c) Karte der Umgebung von Klagenfurt. 1:150,000=2.38 miles to an inch. G. Freytag & Berndt, Vienna, 1909. [Specimens of superior school hand maps in which light, shade, colors and hachures are used to show relief forms. Many elevations are given in meters.]

CENTRAL EUROPE. Vergleichende ethno-geographische Karte der Deutschen in Mitteleuropa. 1:2,500,000=39.4 miles to an inch. By Dr. Willi Pessler. With paper "Deutsche Ethno-Geographie und ihre Ergebnisse." By Dr. Pessler. *Deutsche Erde*, Vol. 8, No. 8, Gotha, 1909. [Distinguishes between the low, middle and high Germans, according to speech and types of dwellings.]

FRANCE. Carte des Gisements de Coquilles comestibles des Îles de Glénan et de leurs Environs. Dressés par J. Guérin-Ganivet. ca. 1:14,400. Illustrates *Bull.* 154, Institut Océanographique, Monaco, 1909. [Shows the state of these fishing grounds in August, 1908.]

FRANCE. Carte des Gisements de Coquilles de la Côte du Morbihan comprise entre la rivière d'Étel et la Baie de Kerguelen. Dressée par J. Guérin-Ganivet. ca. 1:23,500. Illustrates *Bull.* 155, Institut Océanographique, Monaco, 1909. [Shows the state of these fishing grounds in August, 1908.]

GERMANY. Karte zur Siedelungsgeographie des Vogelsbergs. 1:100,000=1.5 mile to an inch. By Walter Diemer. *Geog. Mitt. aus Hessen*, Heft V, Giessen, 1909. [Illustrates "Die Besiedelung des Vogelsbergs," by Mr. Diemer. Six colors for elevations. The methods of expressing social and economic data are worthy of examination. The paper is also accompanied by a map with hydrography in blue, in 1:280,000, showing the distribution of settlements without names.]

GERMANY. Der Selenter-See in Ostholstein. 1:50,000=0.7 mile to an inch. No map net. With "Der Selentersee in Ostholstein." By Prof. Dr. W. Halbfass. *Globus*, Vol. 96, No. 23, 1909. [A black sketch map with contours of the lake depths.]

## OCEANS

PACIFIC AND INDIAN OCEANS. Wärmeverteilung in den Tiefen des Stillen Ozeans 1:60,000,000=946.9 statute miles to an inch. 12 colored Maps. With paper "Die Wärmeverteilung in den Tiefen des Stillen Ozeans," by Prof. Dr. Gerhard Schott and Fritz Schu. *Annal. d. Hydrog. u. Maritim. Met.*, Vol. 38, No. 1, 1910. [These maps, on an equal area projection, give the temperatures of the Pacific waters at the surface and at depths of 100, 200, 400, 600, 800, 1,000, 1,500, 2,000, 3,000, 4,000 meters; and Chart 12 gives the temperatures recorded at the sea bottom at depths of more than 1,000 meters. The paper is also accompanied by diagrams showing vertical distribution of temperatures in the Pacific and 6 black and white charts on one plate showing temperatures

in the Indian Ocean at depths of 100 to 1,000 meters. The observation material procured by scientific expeditions of a number of nations, and especially those of England, the United States and Germany, have been used in the compilation of these important maps which illustrate the present state of our knowledge of the temperature conditions of the Pacific and Indian Oceans.

## OTHER ACCESSIONS

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## ASIA

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